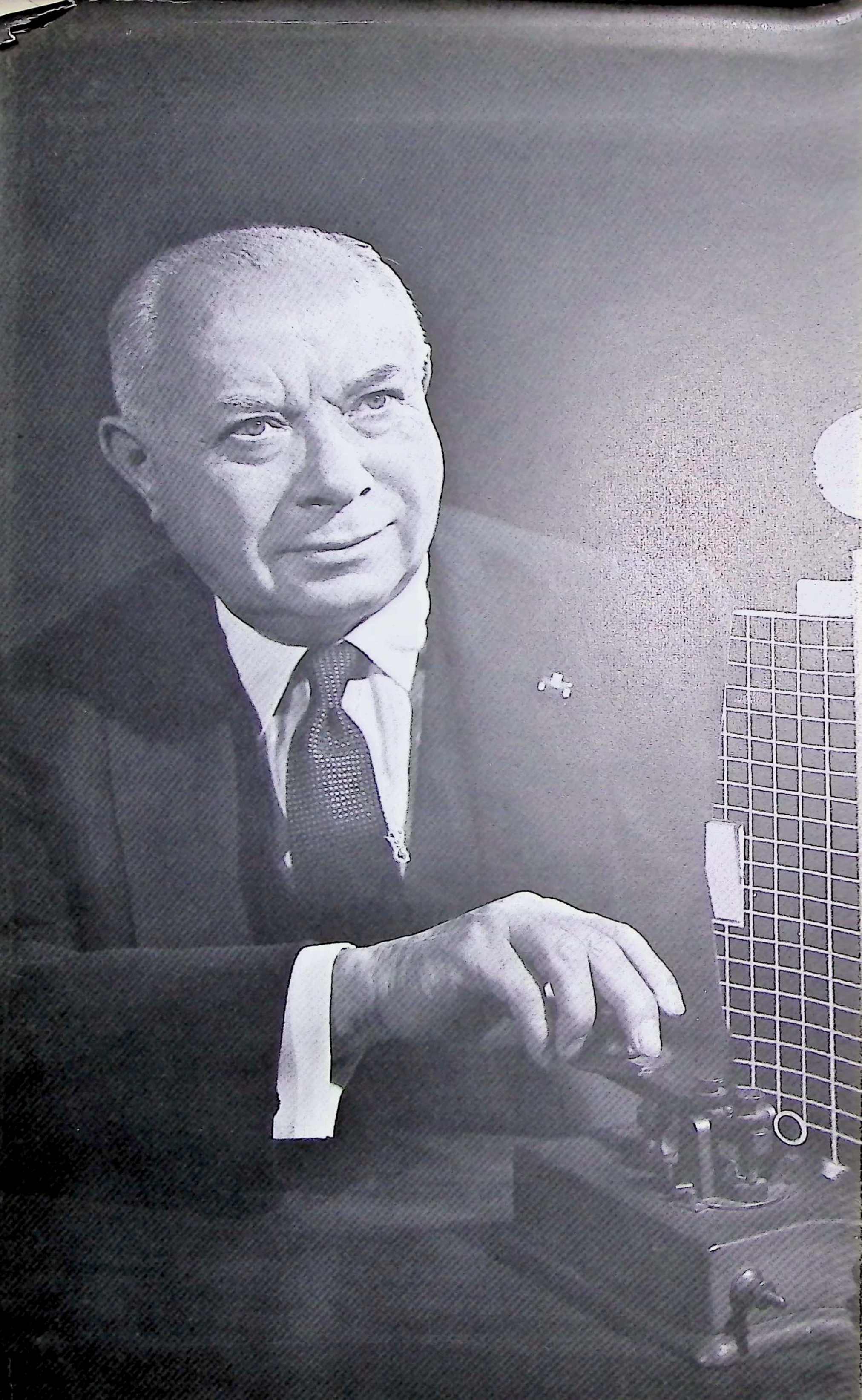
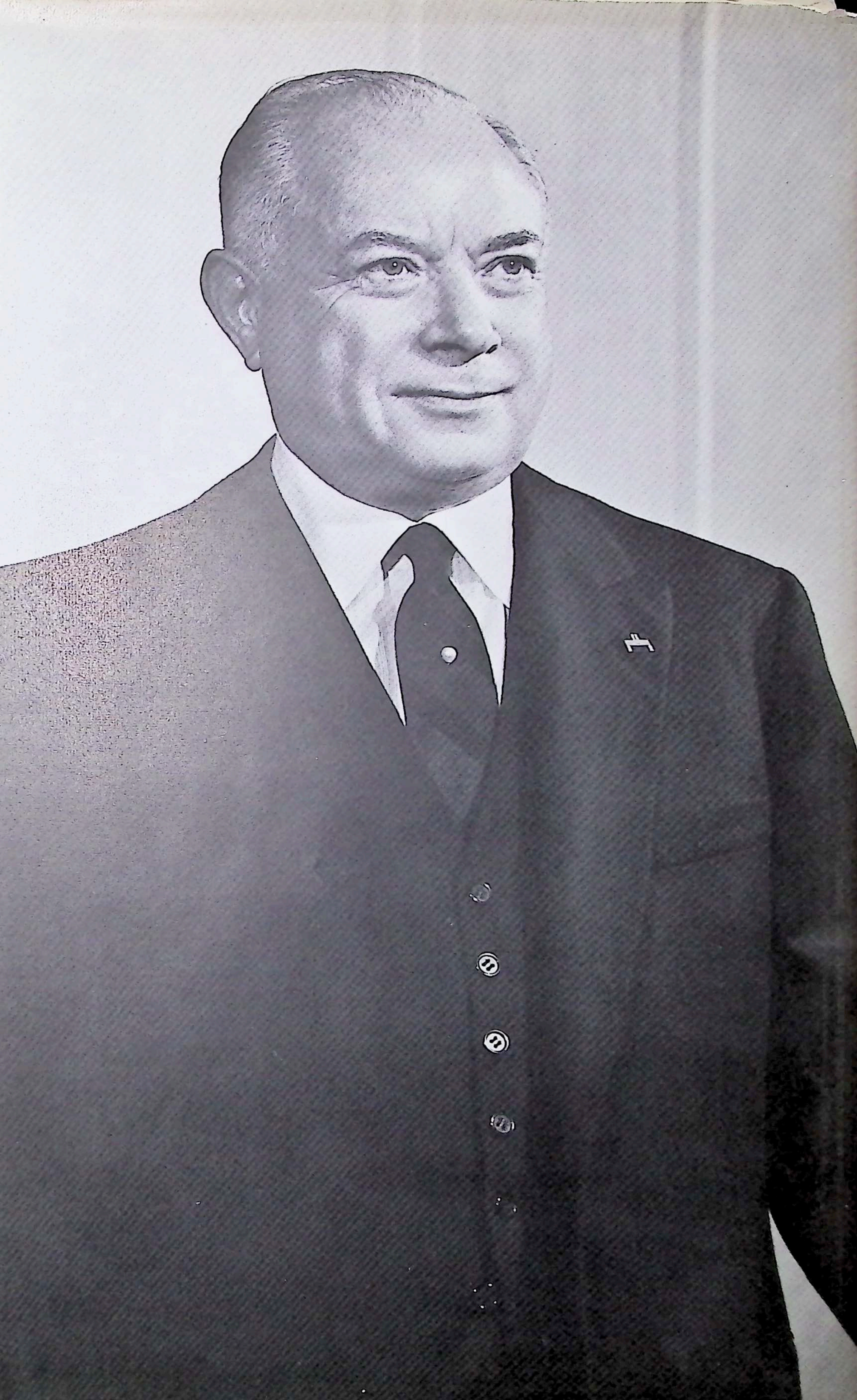
# SARNOFF

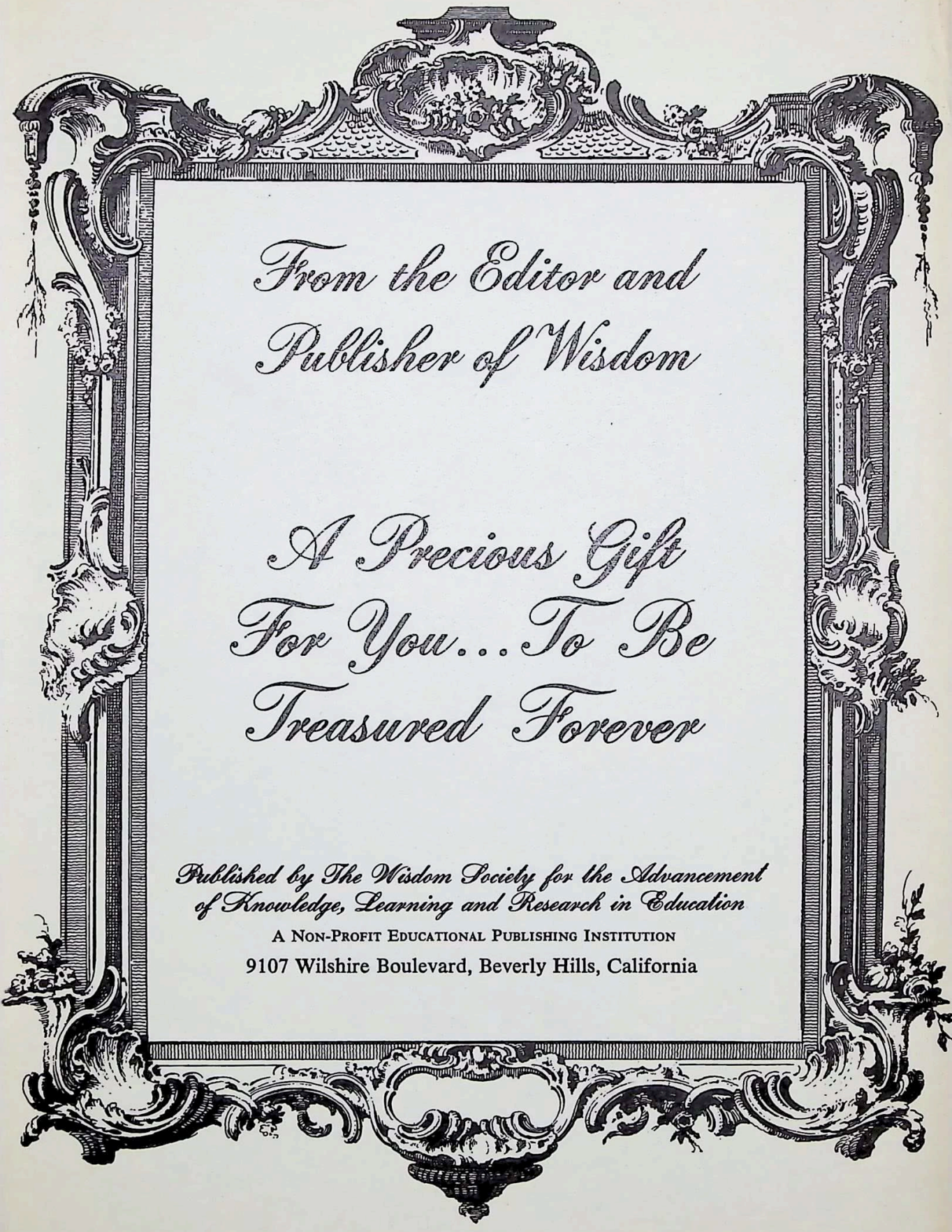
# RCA

AND

# NBC







# *From the Editor and Publisher of Wisdom*

# *A Precious Gift For You... To Be Treasured Forever*

*Published by The Wisdom Society for the Advancement of Knowledge, Learning and Research in Education*

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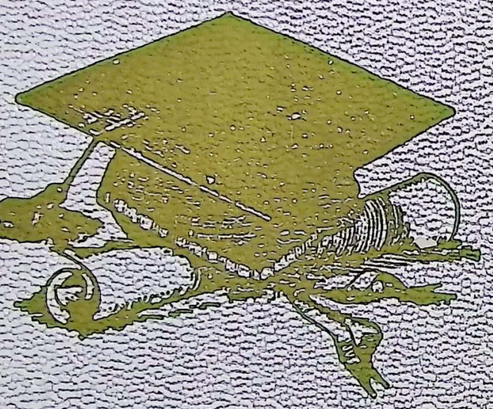


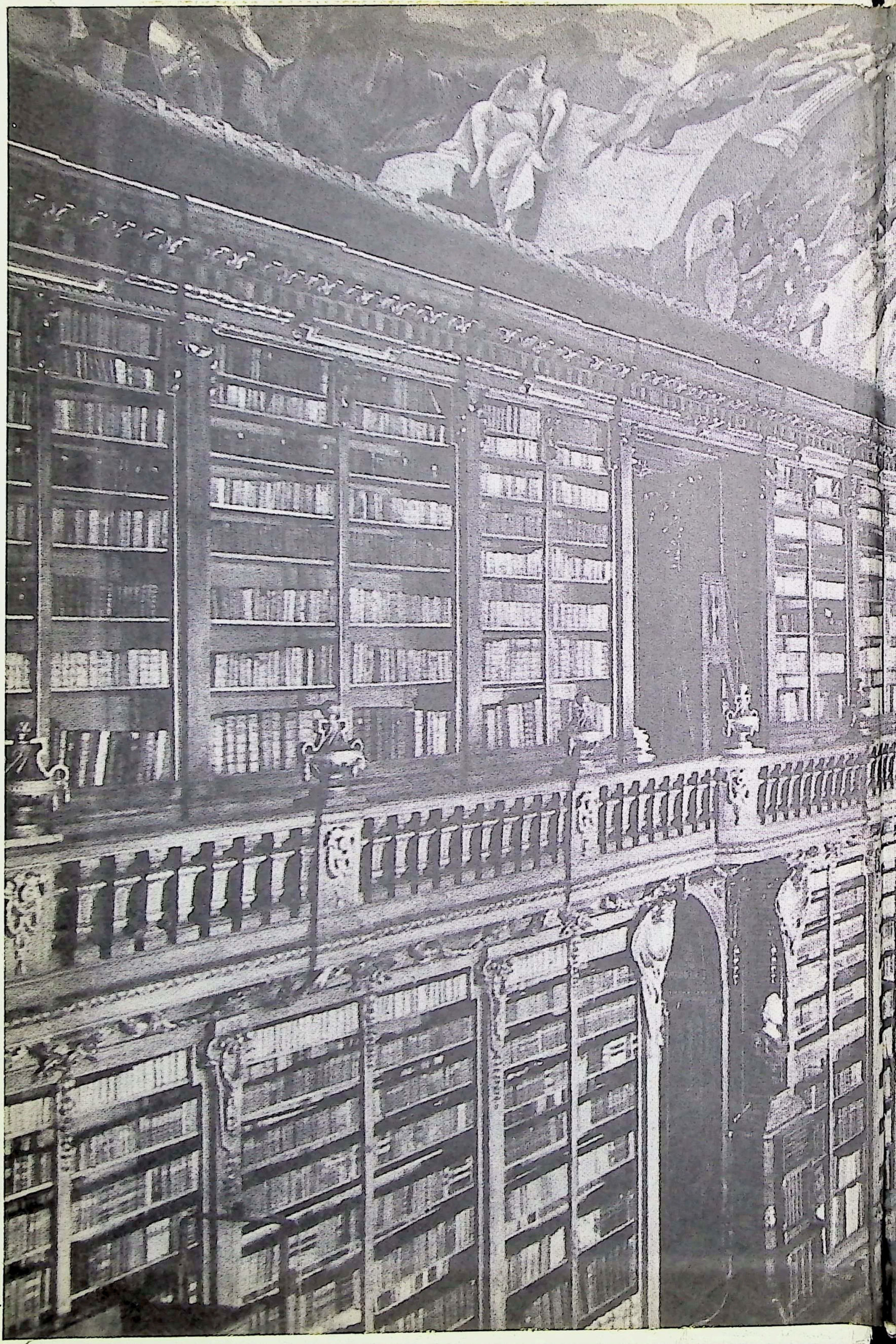
THE WISDOM OF SARNOFF AND THE WORLD OF RCA

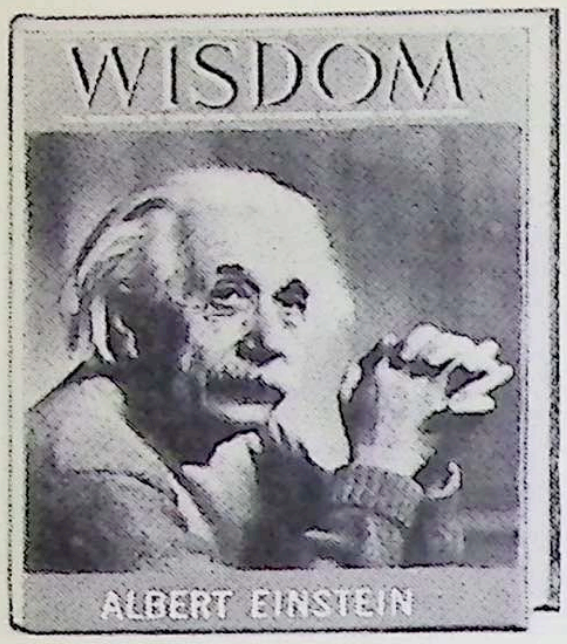
# The Wisdom Of

# SARNOFF

## And The

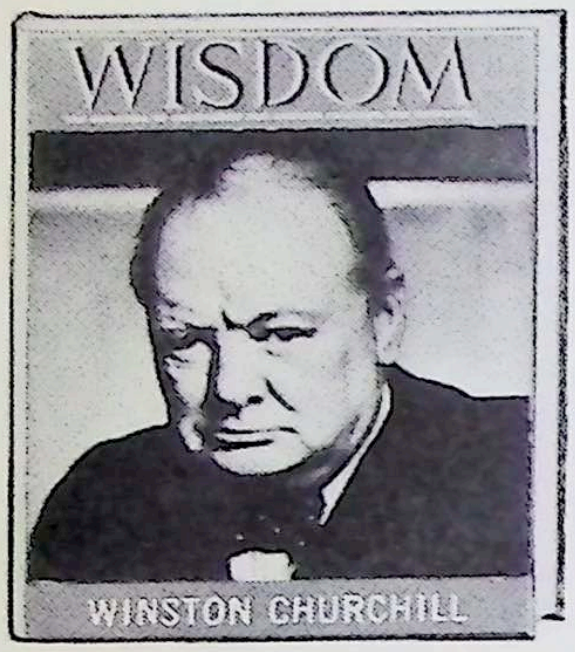
# WORLD OF RCA





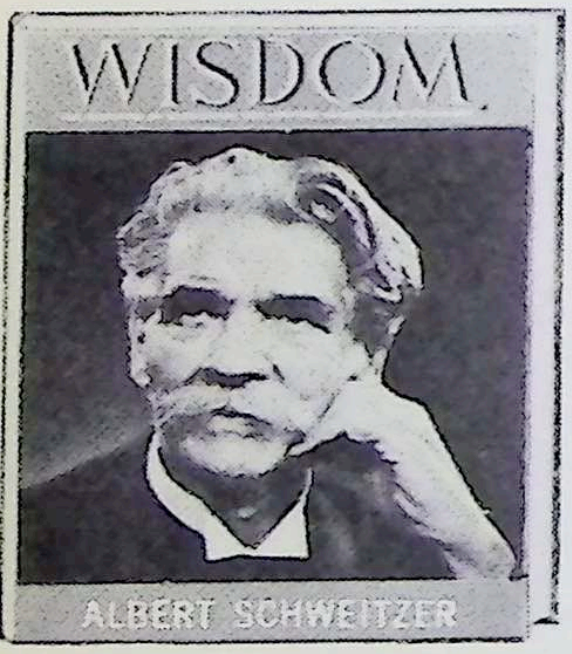

Wisdom is the most valuable possession that this world affords. Without wisdom we are all incomparably poor. With wisdom we are all immeasurably enriched. The love of wisdom creates more wisdom. Wisdom illuminates our minds and shines into our lives to make us wise and happy. It gives us light in darkness, courage in our fears, hope in our despair and comfort in our sorrows. What nobler and loftier goal can we have than wisdom?

A. Einstein




Wisdom is not only the noblest thing in man but also the great hope of the world. It stands out as the greatest power for good. The very survival of humanity depends upon it. Wisdom persuades us to noble and Godly action, to think greater thoughts, and to live more worthily. It gives meaning and purpose to existence. In it lies our only true security and peace of mind.

Winston S. Churchill

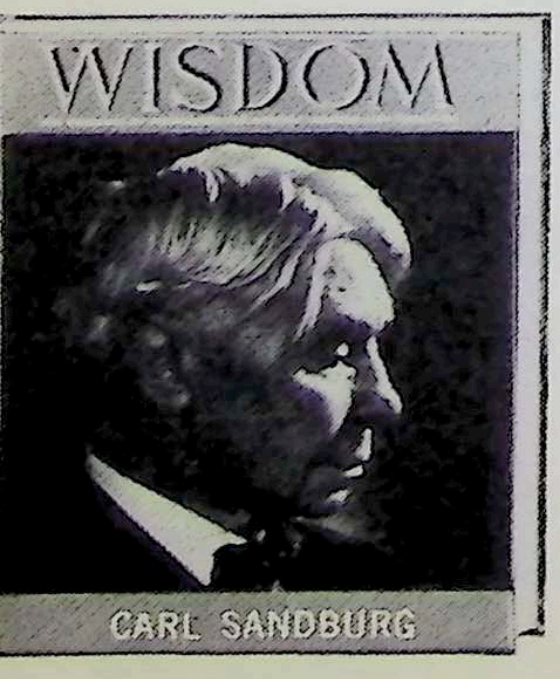



Do we want wisdom to live or die? Shall wisdom perish from the earth at a time when so much ignorance, chaos, suffering, mediocrity, crime, corruption, prejudice, hypocrisy, immorality, greed and gloom prevails in our life? In this turbulent world with its fear and cynicism, its despair and disillusionment, how desperately people need wisdom! Wisdom is the very soul of existence. Only if we have wisdom will we be able to preserve civilization in this most critical period of world history.

Albert Schweitzer

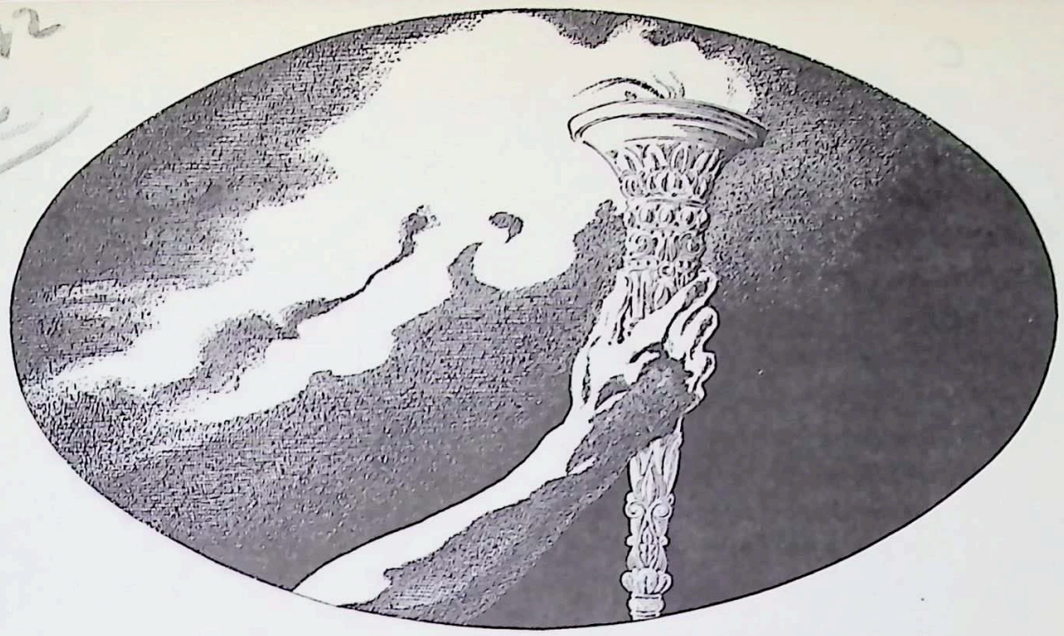
Invite the great men of wisdom into your home. Let them be your friends. Don't think of these men as dead. They will be alive hundreds of years from now. They live in a magic City of God. They are all there in that amazing treasure house of our race. Patiently there they wait for you. Be bold, young lovers of wisdom, and enter with open hands and minds the City of God.

Will Durant

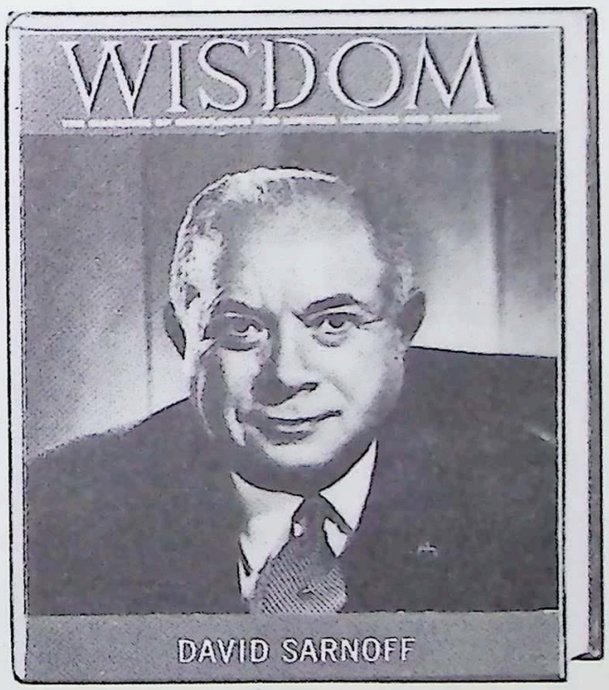



The precious blessings of wisdom have a sacredness for our children and our children's children. Like us, children are hungry for guidance, encouragement and inspiration. They are anxious, frightened, insecure, and confused by the tensions and frustrations of life. They need wisdom in their lives just as much as they need food in their bodies. Let us plant the seeds of wisdom in the hearts of all children, for in wisdom lies their only real chance for happy, fruitful lives.

Carl Sandburg



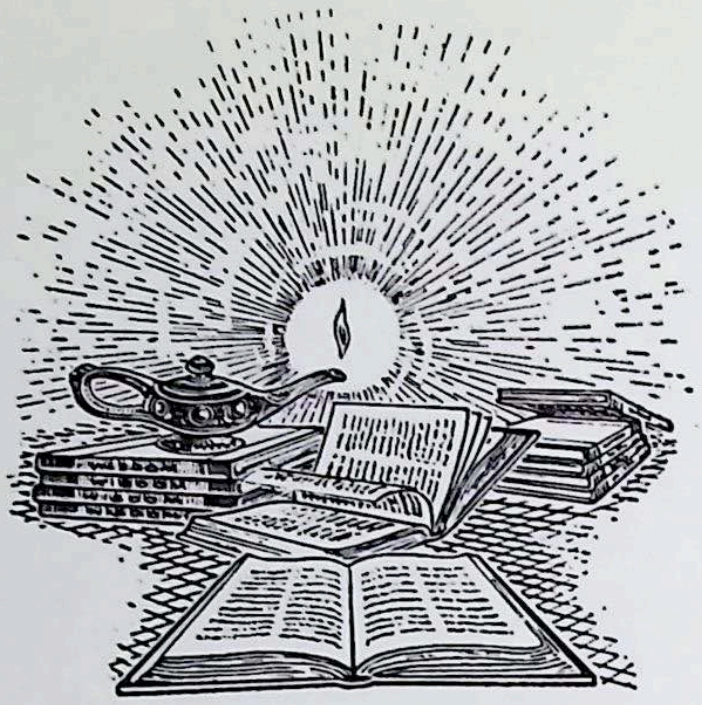
# The Torch Of Wisdom




Some men say that "wealth is power," and some that "knowledge is power." Above them all, I would say that "wisdom is power" because it leads us to what is best, and makes what is best out of us. Of all the blessings which God has allowed us to cultivate, there is not one that endows men more richly than wisdom. With wisdom we know how to think and what to think. We are intelligent, useful, happy. It is wisdom which makes men judge what are the best ends, and what the best means are to attain them. Every production of genius is the production of wisdom. Every great idea in the history of the world is the triumph of wisdom. The best and most important part of every man's life is the wisdom which he acquires, for wisdom gives us precious resources that will endure as long as life endures. In seeking wisdom we are wise, for it is the highest achievement of man.

David Sarnoff

# THE WISDOM OF SARNOFF AND THE WORLD OF RCA



FIRST EDITION

# *The Wisdom Books*

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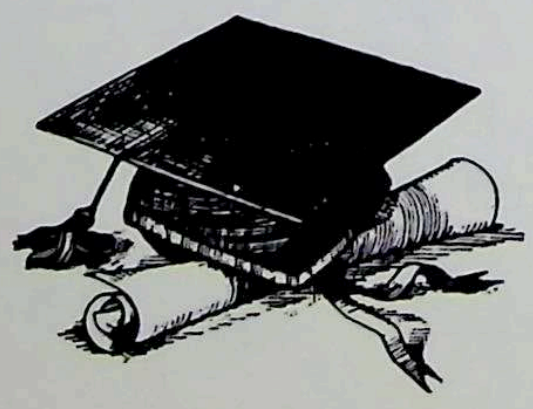
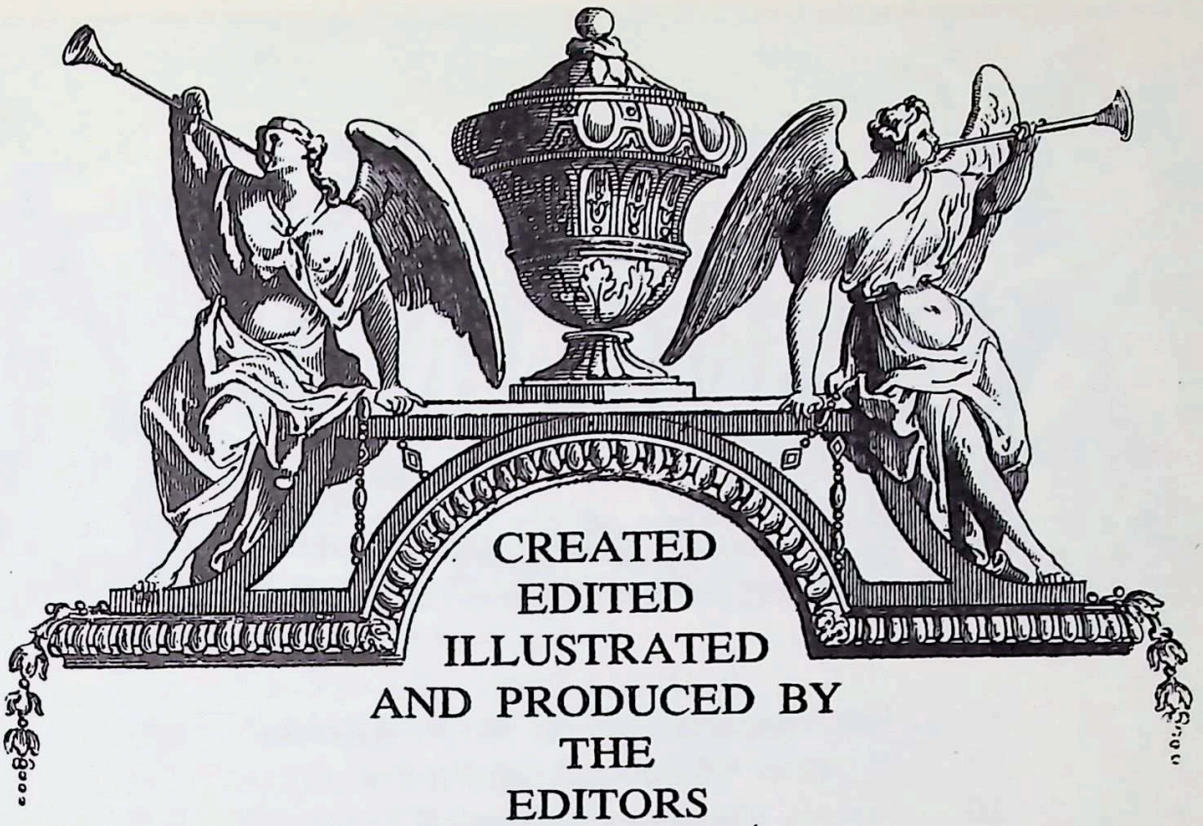
*To lack wisdom is no disgrace. To lack the desire for wisdom is a pity.*
*But to desire wisdom and not know how to find it is a tragedy.*

—LEON GUTTERMAN





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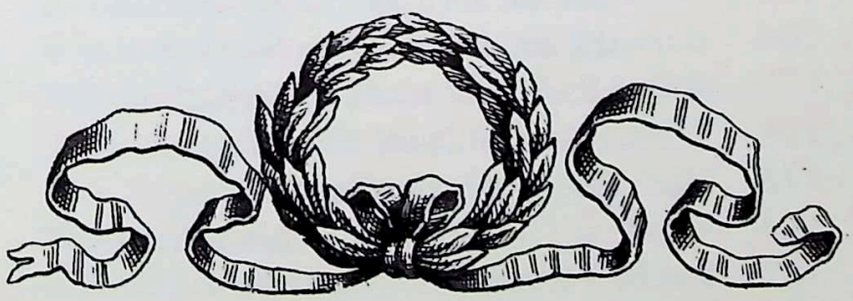

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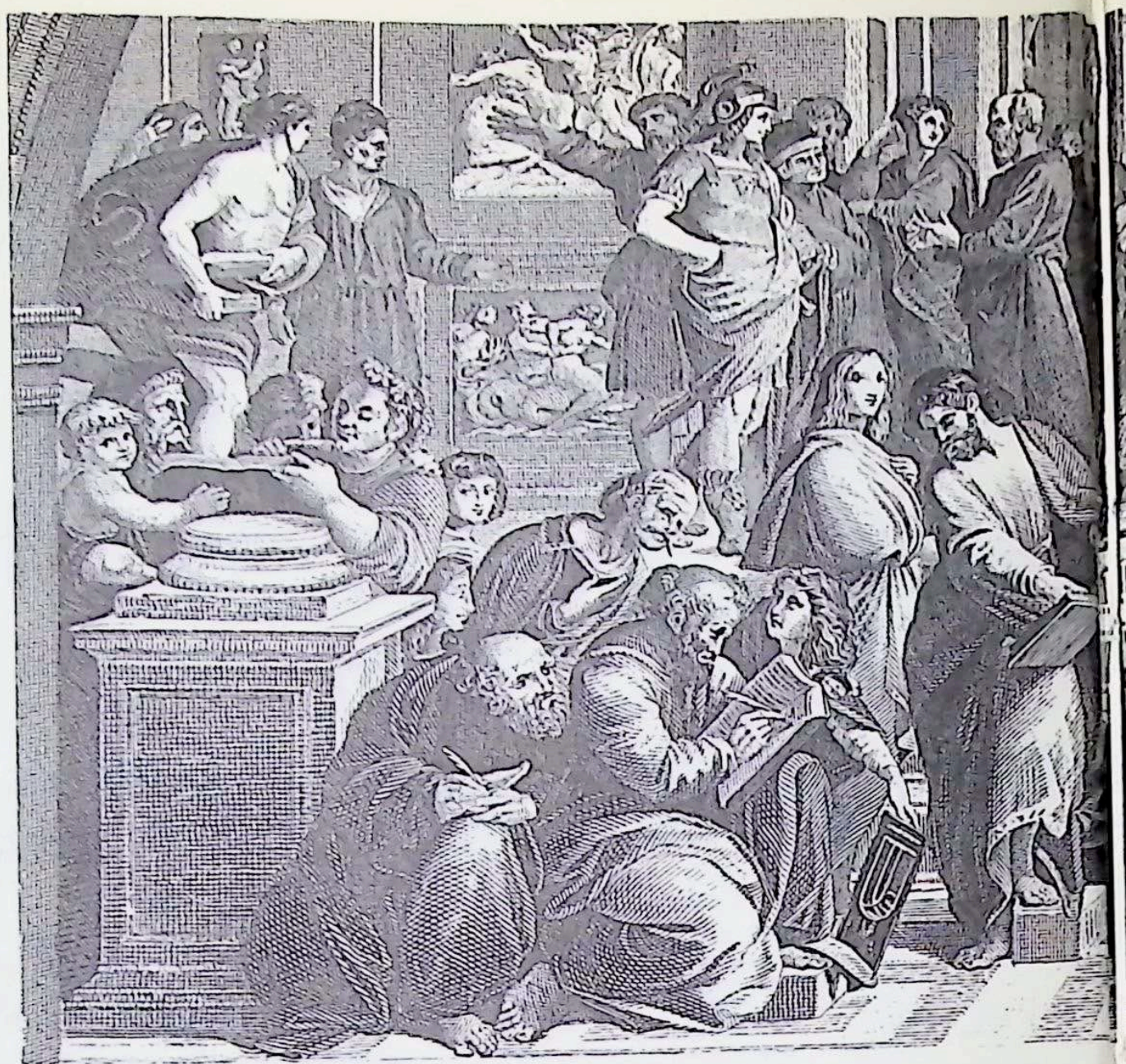
This Wisdom Book contains over 400 photographs and illustrations. The portraits of the following Great Men of Wisdom are the work of the world-famous portrait photographer Yousuf Karsh of Ottawa: Winston S. Churchill, David Sarnoff, Albert Einstein, Albert Schweitzer, Dwight D. Eisenhower, John F. Kennedy, Bernard M. Baruch, Carl Sandburg, Robert Oppenheimer, Pablo Picasso, Ernest Hemingway, Will Durant, W. Somerset Maugham, Jawaharlal Nehru and Artur Rubinstein.



*This painting by Raphael, "The School of Athens," is the most perfect composition in all painting, and is also a masterpiece of architecture of the high Renaissance. Standing in the center are the philosophers Plato and Aristotle debating; on the stairs Diogenes; on the left Socrates teaching and Pythagoras, wrapped in thought; on the right, Archimedes working with a compass and, beside him, famous men of ancient times and more modern ones. The whole is a triumph of scientific investigation.*

# Introduction To Volume One Of The Wisdom Books By

LEON GUTTERMAN
Editor and Publisher

The Wisdom Books
Wisdom Magazine
The Wisdom Encyclopedia

This Wisdom Book is the first in a series of forthcoming volumes to be published by The Wisdom Society and devoted to The World's Great Men of Wisdom. *The Wisdom of Sarnoff and the World of RCA* immortalizes the great mind and extraordinary achievements of a creative American genius and courageous pioneer who has advanced the extension of knowledge and wisdom among his fellow men, and whose explorations into the vast worlds of time and space have immeasurably enriched our civilization. To the miracles of modern communications, radio, television, electronics and scientific research, no single individual in the history of the world has contributed more brilliantly or with greater foresight than General David Sarnoff.

World renowned as "The Father of Radio and Television," Sarnoff stands by himself among the great American men of wisdom. As an eminent industrial statesman he has no superior. A creative crusader of progress, his power over the communications and electronics industries is phenomenal. In his twenties, he envisioned a "radio music box," which would enable the public to enjoy concerts, lectures, and hear news by radio in the home, and he proposed that it become a household utility as the piano or the phonograph. In his thirties, he brought his dream to reality, and announced he would add sight to sound. In his forties, he succeeded in launching television. American science needed American industrial production if it was to serve the useful occupations of life.

In the Radio Corporation of America, David Sarnoff created out of many diverse units one great corporate institution covering the entire field of electronics communication, from research through production. In the National Broadcasting Company, he fashioned a modern instrument for the utilization of the new art of instantaneous communication—an art, to use his words, "which shines like a torch in a troubled world . . . a creative force which we must learn to utilize for the benefit of all mankind." The enormous technological industry he led took electronics into war, and afterwards forged the imposing armory of electronic defense on which the Free World today relies.

Guiding genius of a great organization, no other business leader

has done more for the enlightenment and independence of American thought through radio broadcasting and television. His life is a tribute to the dynamics of freedom. His influence on our times cannot be overestimated. In his career of unique originality, he has applied his vivid imagination to science, his unusual energy to business statesmanship, his strong moral sense to cultural advancement, and his spiritual vitality to national public service.

What name is more eminent in the communication arts and sciences? Who else wears so many crowns as he? Today, every country of the world is cognizant of his vast contributions to radio, television, the fields of communications and electronics. His ability to turn into simple and understandable words the intricacies of deep scientific problems clearly portrays not only a man of scientific knowledge, but one who through the years has had a truly deep interest in the humanities. Deservedly he has won the highest possible honors and awards, both domestic and foreign, and has attained international renown beyond reckoning.

David Sarnoff is one of the best examples of a self-made man that American history affords. The story of his success almost exceeds belief. Fortunately, he was born at the right time for the world to utilize his great talents. His pioneering spirit is an inspiration to the youth of our country. Industrialist, scientist, inventor, researcher, philosopher, soldier, educator, scholar, public-spirited citizen, diplomat, patron of the arts and sciences, philanthropist, humanitarian, prophet of scientific progress, father of radio and television and benefactor of mankind, Sarnoff has a lifelong history of brilliant accomplishment and meritorious service which is distinguished in many ways and covers many areas of human endeavor. These tremendous achievements have earned him world-wide recognition and esteem that come to few men.

A rare combination—a dreamer and a doer—he illuminates this century and our culture. In scientific scholarship and breadth of view, he surpasses all his contemporaries. His wise leadership and pioneering vision have inspired and supported scientists, inventors, engineers, physicists and researchers to extend their knowledge in many fields. The impress of Sarnoff's powerful mind upon his times is everywhere clearly to be seen. With courage, determination and a high sense of purpose, David Sarnoff has mastered the art of harnessing the mysteries of science for the betterment of man's fate and destiny: in the creation of new electronics products and services through research and engineering; in the development of radio and television broadcasting for the public enlightenment and entertainment; in the application of advanced electronics concepts and systems to the defense of liberty; in the advancement of the electronics industry as a major economic and social force. His role as a prophet in predicting the achievements of radio, television and electronics gives us confidence that the still greater miracles he envisions in the challenging years ahead will become realities for future generations.

Always a pioneer, always looking ahead, blessed with the spirit of adventure, and pointing the way for intelligent progress and high integrity, General Sarnoff has, more than any other man, innovated spectacular advances in communications and electronics and blazed a path of progress for more than sixty years. A remarkably versatile man endowed with audacious imagination, a zeal to achieve, and blessed with ideas of incalculable magnitude, his ingenious mind has ranged the universe,

seeking new truths, new conquests and opening new worlds because of his superlative love for humanity. His achievements testify not only to the opulent force of genius within him, but also to the fact that the American dream of equality and opportunity is still realizable in this land of the free and the home of the brave. What is more, he has not only made RCA a corporation of the highest rank, but by the purity of his life and ideals, and the courage with which he always espoused what he believed to be right, he intelligently elevated the public image of the American business corporation, and exercised a profound and wholesome influence upon American politics and public life.

A man of great intellectual stature, renowned for learning and eloquence, General Sarnoff exemplifies the highest tradition and symbolizes the noblest ideals of our country. In his public speeches his matchless eloquence is not solely the eloquence of majestic language. His dynamic voice reverberates with appeals of prophetic thunder. He defends human rights, justice and peace, and his gift of inspired speech sways human emotions as did the voices of history's prophets, sages and martyrs, as he battles valiantly for the truth as he sees it. His inventive genius and industrial leadership, fired by his glowing patriotism, were of inestimable value to America's security, as indeed they still are. His inspired devotion to our country in peace and war and his vigilance in safeguarding and strengthening the American spirit of freedom in our time has served as an outstanding example to all Americans. He has served his nation as a diplomat in peace, a soldier in war, an entrepreneur of music and the arts, and a policy maker in the struggle for freedom. One of the truly great Americans of our time, he has adhered steadfastly to the best values of our nation's history. Intensely patriotic, positive and uncompromising in his convictions, few men have ever loved their adopted land more than he.

General Sarnoff's outstanding contributions towards better understanding among all Americans, and his exemplary public service, as a citizen of the Jewish faith, in providing a forum on the great National Broadcasting Company radio and television networks, for the expression of the democratic ideals through it, has made him universally beloved. No group concerned with human dignity, with equal rights for all regardless of race, color, religion or origin, has failed to obtain a fair share of his NBC facilities to make its voice heard by the American people. He has given the Protestant, Catholic and Jewish religions an opportunity to ensure a free interchange of ideas and to carry their message to the people—thereby he has helped the cause of democracy, not only by eliminating the cancer of bigotry but by inculcating those universal precepts of the Judaic-Christian religion upon which our democracy is based. For over sixty years, he has been unstinting in his effort to bring to the American people a realization of the urgent need for the universal tolerance of human freedoms.

Honored by celebrated institutions of learning and decorated by our own and foreign governments, David Sarnoff's unusually eventful life of service to our nation and contributions to the world have been wide in scope, outstanding in quality, and enduring in significance. Through example and precept, and measured by the highest standard of intellectual integrity, he has furnished an inspiring example of notable leadership for his fellow Americans, and especially for the youth of our country. Science bears testimony of his insatiable thirst for knowledge. Industry

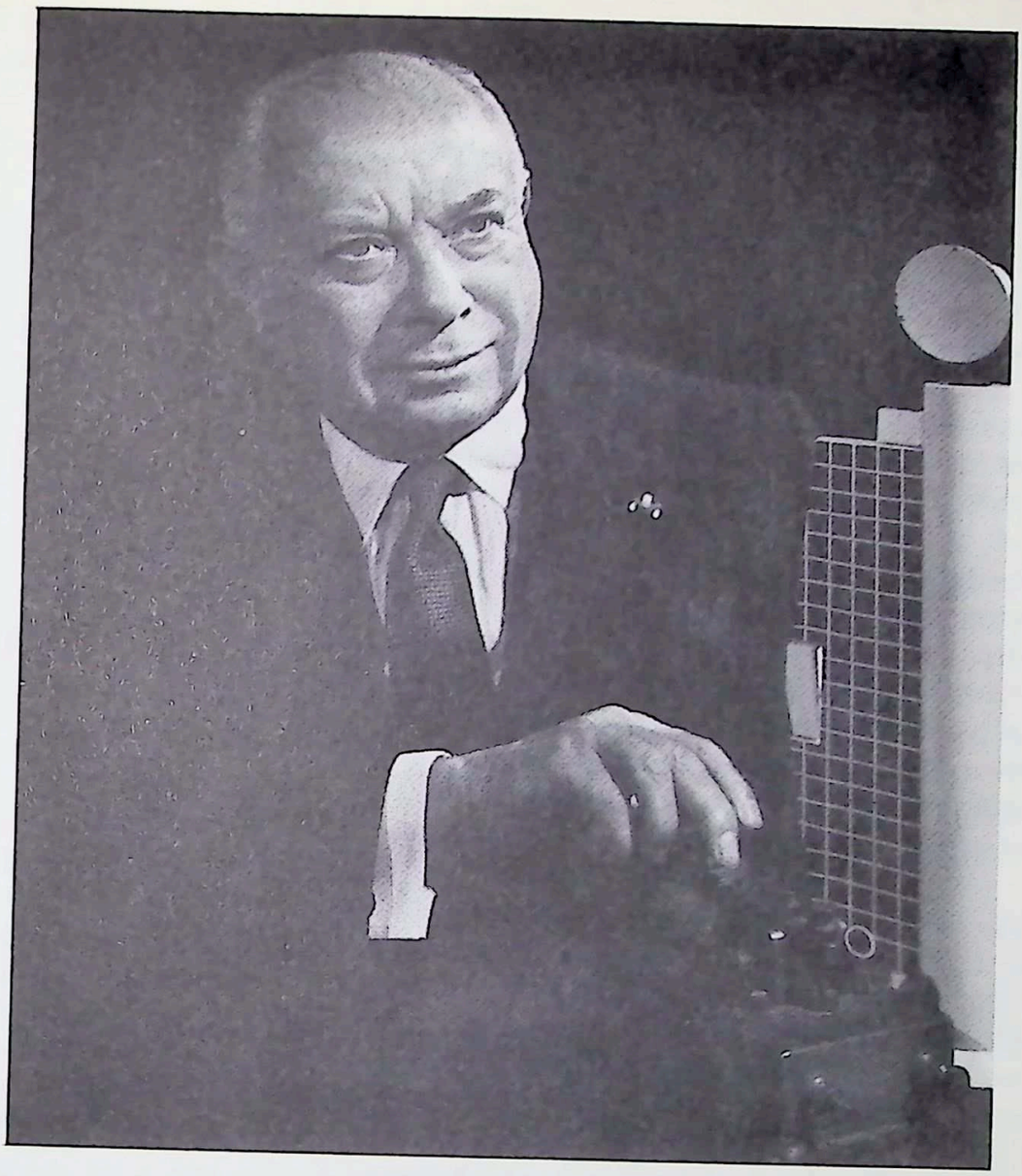
gives proof of his creative ingenuity, and men, women and children everywhere are the beneficiaries of his contributions to science, industry and government. General Sarnoff's devotion to the furtherance of American ideals, his extraordinary thinking, his consecrated service to humanity, and his invaluable contributions to the enrichment of the cultural heritage of the world have won him the admiration and gratitude of all mankind.

This colossus of science and industry who wisely counseled governments has a genuine interest in the institutions of higher learning which determine whether scientific knowledge and economic power will be used to advance or destroy humanity. In the muted chambers of government, the paneled offices of industry, and the open forums of our colleges and universities, General Sarnoff has espoused the use of all knowledge for the advancement of humanity. In the face of perils and responsibilities of a volatile age, he admonishes that although the risks are greater than heretofore, so are the possible rewards.

Because his achievements are an enduring monument to progress; because he is an inspiration to people everywhere; because his prodigious contributions to the science and arts of communication have brought men everywhere closer in mind and spirit and into more enlightened communion—uncounted millions of human beings the world over call him blessed for the inestimable good he has done and continues to do. Not only have his accomplishments for the advancement of humanity won the admiration of the world, but the good he has done will last through time and on through eternity.

Above all, his keen realization and deep conviction that science is a means not an end; that living must take into account the enduring spiritual values which alone have made us a great people; that though science will continue to be lavish with its gifts, our problem is to learn how best to accept and use these gifts for our spiritual enrichment—these convictions present David Sarnoff as a Great Man of Wisdom who looks beyond appearances and sees the spiritual realities, the laws governing our universe, laws which give substance to the shadows and hold together the civilization and culture of a nation.

History reserves a special place for those few gifted men of each generation whose genius is the funnel through which ideas pour into action and action is crystallized into progress. Thus, this volume, the first in the forthcoming series of Wisdom Books devoted to the World's Great Men of Wisdom, commemorates the greatness of David Sarnoff with respect, esteem and admiration, and adds lustre to his name by enshrining it in the Wisdom Hall of Fame with the World's Great Immortals of Wisdom—great men who have lived through the ages and whose lives have been a blessing to mankind. It is our sincere and earnest hope that this imperishable literary monument will be an everlasting source of wisdom and inspiration—today and for generations to come—for all the people in America and all the people in the freedom-loving countries of the world. May this Wisdom Book help to bring us nearer to that cherished goal for which good and earnest men have yearned throughout the ages—the goal of realizing high and worthy ends so that we may create a Better World that shall be built upon the abiding foundations of moral and spiritual truth—a world in which all human beings may come to live abundantly, aspiringly and creatively, and life may become full and free, meaningful and worth living for all.



# THE WISDOM OF SARNOFF ON *His Philosophy Of Life*

I distinguish between knowledge and wisdom. They are two different things. I believe that knowledge is not necessarily a guarantee of wisdom. Some people who have very little knowledge have a great deal of wisdom, and some people who have a very great deal of knowledge have very little wisdom. That doesn't mean that knowledge is unimportant, or that wisdom would not be helped by knowledge.

Wisdom is the combination of experience with life, the attitude of man towards man. It is human understanding. It is character. It is a combination of many things. To know how another person is going to react to a given situation is a product of wisdom, not of knowledge.

We have retrogressed in wisdom in the last 2500 years, although we have gone forward in knowledge. I think we have gone back in wisdom in our failure to appreciate fundamental values of life. The things that we regard most important today are not as wise as the things that were regarded most important in the past. Our present preoccupations more and more revolve upon our achievements, status, and what other people think of us.

Learning, understanding and spiritual development are not as apparent today as in the past. In the past that type of understanding and wisdom was limited, but the thinkers had it. They took more time to think because they didn't regard anything else as important. Those people were more concerned with spiritual and ethical and moral concepts than they were with particular things. Today I don't know that you can point to a Socrates, Plato or Aristotle. When we speak of wisdom today, we always go back to somebody that isn't alive today.

If a man has the opportunity to express, unimpeded and unhampered, the forces within him, whatever they may be, and to develop those forces, that to my mind is the greatest measure of success. If I could play the violin and were given the opportunity to develop my talents, and I achieved this self-expression, then I would say I was a success. The same holds true for a bricklayer. If I wanted to be the best bricklayer, and achieved it, this would be success. A part of this success would be the means of being able to provide, but wealth is not an evidence of success, nor its possession an evidence of achievement.

Success is: the opportunity to express the forces within one; to achieve such measure of happiness as one can derive from his work; to be able to have at least enough of the goods of the world so one is independent and not dependent on somebody else; and the opportunity to serve others, to advance something, to leave the world a little better than you found it. And, finally, to achieve as much peace of mind as one can. I think one has to divide that formula between those who are sensitive persons and those who are not. I doubt that anyone endowed with imagination can achieve success, happiness or peace of mind. If a man is a perfectionist,

or has imagination, it changes the formula.

The sum total of our knowledge is infinitesimal compared to the size of our ignorance. Every advance on the frontier of knowledge opens up a great vista of the unknown. The scientist is not happy except when he finds something. Science is an incomplete task just as life is incomplete. He can only be happy because he has the opportunity to continue the search. Fulfillment can never be there so long as knowledge is imperfect. The search for truth is not a peaceful occupation.

The happiest people I have known have not been the men of great worldly achievements or accomplishments or wealth. They have been the simple people who are happily married, enjoying good health and good family life. I do not think we reach for the stars or moon because we make up our minds to do so, but because we can't help ourselves. Imagination is not an attribute of happiness. A person can be very happy when he knows nothing. While it is true that you can get happiness and peace and serenity from being at the lower end of the ladder, it is also true that you cannot enjoy the ecstacy of achievement. Success in the generally accepted sense of the term means the opportunity to experience and to realize to the maximum the forces that are within us.

Without creativity the world would be lost. Whether that be in science, politics, psychology, business, or anything else. The world depends not only on creative ideas, but on a constant flow of them.

Patience is a two-sided coin. If patience is to be a virtue it must be employed in the willingness to obtain all the facts, to deduce from the facts what should be done, if anything, and to act in time and not too early or too late. If patience is merely to be used as an excuse for inaction, and if you don't do anything but wait—and you wait too long and the opportunity is past—or if you convert it into lethargy or inaction, then that is the other side of the coin.

Thinking is a most important and most neglected art. One of the criticisms I would suggest against our present system of education is the lack of training in the art of thinking. I think it can be developed by spending more time on the interpretation of knowledge rather than in the mere acquisition of facts.

The will to persevere is often the difference between failure and success.

State of mind is a very important factor in success because you can condition your mind to a point where it enables or prevents you from going forward and doing things. You can poison your own mind and limit your own capacity. Don't admire the fellow that says he has an open mind—

it is usually a mind with nothing in it. A man who has a state of mind based on knowledge and wisdom, experience and reason, has won half the battle, and, conversely, the other man has lost the battle. State of mind based on balanced judgment is a precious possession, but being unreasonably optimistic means nothing to me, nor does being excessively worried.

No man by himself can achieve very much. If he is great and his product is limited to his own output he is very small. He is an atom and unless he can create a chain reaction he is only an atom. I regard human relationships between business itself and between big business and little businesses, or little businesses and little business—a competitive struggle so great that it often brings out the worst there is in man as well as sometimes the best in him.

Immortality is something on which to philosophize, but it is something about which we know absolutely nothing.

Work is all important because that is the only visible and intelligible excuse for our existence. Man expresses the forces with which he is endowed. Work is the most satisfying experience of the day.

I don't think time is the same for every man. It depends on what he is doing and what he has to offer. I think if a man is retiring because he is tired of his job then he is headed for misery. Man cannot go someplace and not take himself along. If he could retire from himself that would be fine. My advice would be this: Change—don't retire. Change from a position to something else where you may try to express your forces in another line. To retire to achieve self-indulgence doesn't mean anything.

The conquest of fear is a genuine blessing if you can achieve it, but I know of no formula.

It is not possible to do much with the young mind if you don't improve the old mind. Older people are going to be here for a longer time. I think the old problem of juvenile delinquency is a problem of adult delinquency. Improving the mind is not quite as important as improving the quality and character of the human being so he will be able to distinguish between right and wrong. Some of the best minds have had some of the most deplorable characters.

I don't associate mind with character. First assure character and then work on the mind. You build the mind on a foundation of good character, the basis of which is home, church, school. In that respect we have retrogressed rather than improved. Parents can't expect their children to be better than the example set at home. They can't practice all the things

that are wrong and then expect the children to do all the things that are right. Such training is the responsibility of parents and teachers.

Courage is what you find lacking in most people because courage is constantly limited by fear, and fear is possessed by most people and possibly by all people.

If the leisure time to come is used well and with wisdom, then I think that man, for the first time, may come into an era where he will have opportunity for education, culture, contemplation and the better things of life. We need education before leisure. It is more important that we be educated to the proper use of leisure than to the proper use of labor, as labor has certain built-in regulations. Leisure, beyond sleeping or relaxing, if the remainder is not intelligently employed, could be a disaster rather than a boon to mankind.

The man of tomorrow may work only two hours a day. One cannot assume that the purpose of man is to work merely to keep himself alive. Work is a means to an end and not an end in itself. The problem of the future will be the problem of leisure, not the problem of labor. The answer lies in that this may be the first time that man will have the opportunity to do what Socrates did—contemplate and not have to slave. If cultural, religious and moral forces are inadequate man will seal his own doom. That is the big problem of the future—the problem of leisure.

Good men have lived and died and have passed on, and, in due course, have been forgotten. But not those who have spent their life in the love of mankind, in efforts to make the problems of others their problems, and in helpfulness to all who came within their orbit.

It isn't always large sums of money, but large amounts of brains added as an ingredient that can produce great results. In fact, we are learning that the greatest power resides not in big things but in the little things. The atom, and the electron for instance. The atom, the smallest material particle of nature, and the electron, the smallest electrical particle of nature, when arranged in proper relationship to each other produce the results from H-bombs, A-bombs, guided missiles, satellites, and many other things you have been reading about in recent years.

It isn't always the big thing, but the proper relationship of little things that count most. Even little people can produce a human chain reaction that can release as much energy for the benefit of mankind as the physical energies can release for destructive purposes.

No one can chart a course upon which humanity will travel for the next fifty or seventy-five years. No one is wise enough to do that. The best

illustration of this is the fact that if anyone—at the beginning of this century—had tried to predict the developments that would take place, he would not even have mentioned Lenin or Stalin or Khrushchev. He would never have heard the names of Hitler, Mussolini or Mao Tse-tung. He would not have spoken of Freud or Michaelson or Einstein in 1900. Yet just these few names have altered the course of history. No one today is able to mention the names of those, who in the coming fifty, sixty or seventy-five years, will make the greatest impact upon the world.

It is not the things we know that are always the most important. It is often the things we don't know, the things that the human mind cannot comprehend that ultimately come to affect the whole universe, and all that are within that universe.

The use of the tools which we are continually inventing and developing and improving become important only insofar as their use may be applied to the beneficent uses of mankind.

A knife in the hands of a surgeon may save a life. But in the hands of an assassin, the same knife can destroy a life. It isn't the knife that makes the decision. It's the use of it that is all important.

Who can doubt the need for recognizing spiritual values at all times? This is especially urgent in an age marked by enormous and rapid changes in technology, economics, politics and other aspects of our life. The evidence is all around us. Change is inevitable; and often it is a mark of progress. But it must not be carried over into departments of life that rest on moral and ethical principles which are changeless. This is a very real danger and one against which all of us much constantly be on guard.

Frequently, we hear modern technology blamed for the present world conflict and confusion. Many people seem to forget that technology, by itself, is neither good nor bad. While it can raise living standards and provide a better life for all mankind, it can also destroy people, homes, cities—and even continents.

The fruits of science and technology are not free from peril, for man has gained control over terrifying forces of destruction before he has learned to control himself. The greatest of all deterrents to the havoc these new forces can create, is a decent regard by man, for the moral and spiritual values. Hence, man is the great unknown in the fateful equation of our time.

Today, man stands at the threshold of his most stirring adventure. He is heading into the uncharted space of an unknown universe. But his

conquest of outer space, however spectacular, will be all in vain if he fails in the more important conquest of inner space—the effort to know himself and his fellow man. Rarely in the past has there been such urgent need as there is today for human understanding and a regard for spiritual values.

We cannot hope for a world at peace if half of its inhabitants are underfed and the other half are overfed. And without peace, we cannot expect to enjoy the progress of technology and the blessings of security.

We must continue our search for peace and plenty, persistently and intelligently. But, to have lasting value, our efforts must be guided by the principles of universal morality.

All of us can understand that the mind of man cannot be expected to function rationally, if his stomach is empty. Hunger is not conducive to peace.

In our own lifetime, we have witnessed dramatic revolutions in science and technology; in economics, in government, and in many other areas. What we need now is a spiritual revolution.

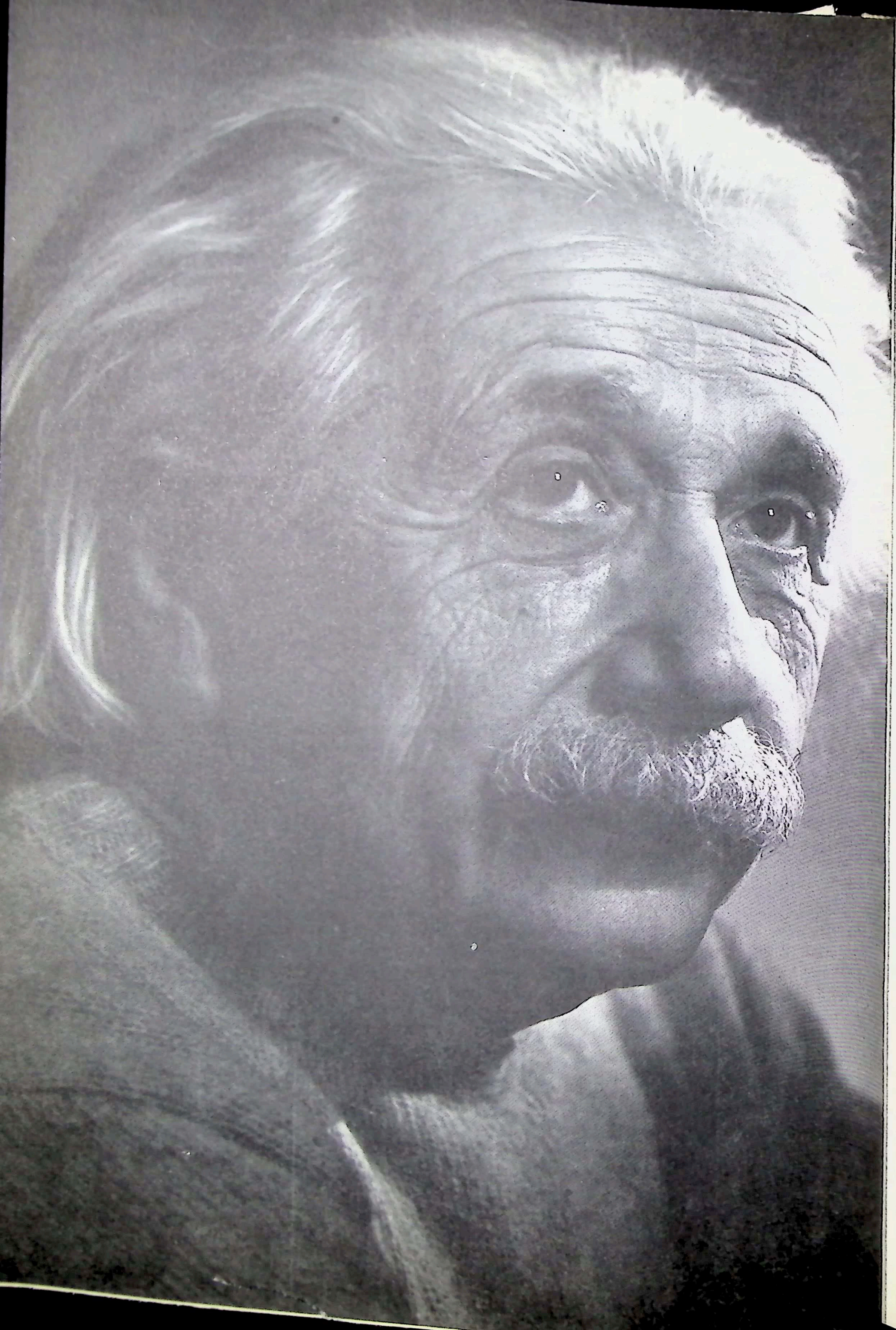
The remarkable talent for innovation that we have shown in the physical sciences, should be brought to bear in the political and social sciences, and in the spiritual domain.

No matter how the universe may be expanded, the center of that universe remains man himself.

The divine spark that sets man apart from lesser creatures, imposes upon him a personal responsibility for his own conduct. And that responsibility remains constant despite the pressures of a changing world.

Under the turbulence of change, there is a bedrock of unchanging values. Nothing that science or technology will produce in the future can replace the moral and spiritual insights of the past and the present. Freedom and justice, understanding and compassion, virtue and love, cannot be replaced by machines—not even by automation.

We must face up to the fact that we cannot bypass the hard disciplines of the good life, or evade the responsibilities of defending our moral heritage. We must be prepared to strive, to work, and even to fight, if necessary, for the everlasting principles that give depth and meaning to our life.



*In 1921, Sarnoff (left) demonstrated the RCA transoceanic station at New Brunswick, New Jersey, to a distinguished group of scientists. One of his guests was the world-famous physicist Albert Einstein (right).*

A great man stands like a solitary tower in the city of God because he is the servant of mankind, not they of him. There is no higher religion than human service. To work for the common good is the greatest creed. A great man is the gift of a kind heaven to a poor world. He who does the most good is the greatest man. A man of great and shining qualities, David Sarnoff does not stand alone for magnificent ideas and worthy deeds, he stands also for great virtues and the advancement of human service for the common good. A man of splendid talents, admirable intellectual attributes and noble purposes, his fertile mind has produced a most abundant harvest. He has come to true greatness because his life belongs to his adopted country, America, and what wisdom God has given him Sarnoff has given to mankind. Sarnoff has opened up new worlds for humanity with his inestimable contributions of radio and television, and he has stirred the world with great thoughts. His name will live on and will be universally acknowledged and perpetuated for all time through his achievements, which have improved, exalted, and increased the happiness of human life. It is difficult to overestimate his services to mankind. Immortality has crowned the work of this extraordinary man.

A. Einstein

ALBERT EINSTEIN
*Scientist, Physicist and Educator*

*Albert Einstein, distinguished scientist, lover of mankind, citizen of the world, and one of the greatest scientific minds of all ages, is shown being posed by famed photographer Yousuf Karsh. The portrait (opposite page) was the cover of the first issue of Wisdom Magazine, which was devoted to Einstein's wisdom and published in tribute to his illustrious achievements in science. An eminent recipient of the Wisdom Award of Honor, Einstein was one of the notable Americans who inspired and encouraged the creation and publication of Wisdom.*

I happened to be born about the time that the electron was discovered. The electron was discovered by a British physicist named Professor J. J. Thomson—around 1895. I was born in 1891 so that I hitched my wagon to an electron rather than to the proverbial star. We've been traveling together ever since. Now I take no credit for that because I had nothing to do with either the date of my birth or the discovery of the electron.

I came to this country in 1900 and I lived on the East Side, on Monroe Street, in New York City. I went to public school there, but the very first school I was taken to was the Educational Alliance. I was not able to speak a word of English and there they taught English to the immigrants, whatever their native tongue. After I had been at the school about a week or so, the teacher told me that I was to speak at an assembly. I was given a recitation with one week's knowledge of the English language. I'll never forget it. The recitation was, "Cleanliness Is Next To Godliness." I studied it, and I recited it, and I memorized it. Of course, I felt like quite a big shot that I was to appear before the group. The news got around the neighborhood, for even though we were greenhorns we had communication systems that were terrific. My mother and father thought this was a great event. Their son, just come to America, was going to make this public address. They came to the assembly hall and, when I heard my name called, I appeared on the platform. Somehow, without any explanation that I have ever been able to offer, I just blacked out. I was a complete dud. I couldn't remember a word. I stood there for awhile, embarrassed—the most embarrassing moment of my life. My poor father and mother were sitting there, watching their offspring flop. After awhile, the teacher very kindly escorted me to my seat. I never quite recovered from that failure. I have spoken quite a little in the last 67 years before various audiences, but I have seldom forgotten my first experience as a public speaker. This is what it did for me. I joined a debating society in the Educational Alliance right away. The name of that debating society was the Paul Revere Society. And, just one year after this fatal experience, I was debating in the Educational Alliance. I didn't know much about many subjects, but I was debating anyway. About thirty years ago, the Educational Alliance was celebrating its fiftieth anniversary. Some of the prominent figures of that time, like Governor Al Smith, Mayor Jimmy Walker, Governor Herbert Lehman and a great many distinguished men, came to participate in that celebration. I was invited to be a speaker on that occasion. I accepted. And there I stood, on the same platform where I had failed before. I told them that story and said, "I have only one speech to make and I am going to make it right now: Cleanliness Is Next To Godliness." That was a day I achieved one of my ambitions.

In a simpler past, people and nations could afford to treat "good will toward men" as an adornment of existence—desirable but not imperative. The penalties for failure to adhere to this ideal were harsh but within tolerable limits. There was, at worst, always a second chance. Today, the realization grows upon many of us that the ideal has ceased to be a luxury and has become an absolute necessity. Today, in a literal sense never before so apparent, the moral law has become the law of survival.

More and more people in all countries begin to grasp that the crisis of our time is not political, or economic, but moral. The problems with which nations are so concerned—problems of boundaries, governments, trade, reduction of armaments—are, in the last analysis, symptoms rather than causes. Temporary solutions and delaying expedients may be found. But they cannot be dependable or enduring as long as the moral ailments from which the problems derive remain and fester.

Most of the world's problems are related to the great struggle now under way between the Sovietized and the relatively free worlds. Outwardly that struggle involves issues of power and territory and contrasting economic systems. But under the surface it is a deep-reaching contest between our Judeo-Christian civilization and a godless way of life and thought.

It is not the Communist economic theories or the Soviet political theories which threaten us. These we regard as false, but they do not engage our emotions. Our fears are engendered, in the final analysis, by the essential immorality of the Soviet system—by its open renunciation of truth, justice, kindness and other values we cherish. Our compassion is aroused for the victims of systemized brutality and the suppression of simple human rights.

It is the Kremlin's denial of God in words and terrifying actions, that we recognize as the real menace. The great Russian writer and spiritual leader, Leo Tolstoy, once said that he feared the rise of "the savage with a telephone." He meant, of course, the moral savage armed with the tools of modern Science. Unhappily his prophetic image has turned into grim reality in his own country and the countries under its iron heel.

The decisive difference between the Communist and the Judeo-Christian views of life will not be found in the differing institutions of the two worlds. It is rather, in their irreconcilable appraisals of the individual.

To us, human life is sacred and inviolable. To the Communists, the individual is a cipher; people are so much brick and mortar for the construction of their soulless Utopia. They demolish a human community as nonchalantly as if it were an anthill. That, I believe, is why the Church has been fighting communism, courageously and consistently, refusing to compromise on essentials in the name of expediency.

It is not an accident that totalitarian states find themselves in stubborn conflict with Religion. If the issues between them were merely political or economic, some *modus vivendi* might be found. But the overriding issue is always moral—the value of human rights, the sacredness of the individual soul—and, therefore, not subject to compromise in formulas of coexistence. The crisis of our time is fundamentally moral.

We have fallen into the habit of dividing time into labeled "ages"—the Steam Age, the Atomic Age, the Electronic Age. But the basic moral guiding lines are ageless. They are the values distilled from man's total experience. Precisely because we now have in our hands such immense natural forces, we need a sure anchorage in the soul. We need a renewed and revitalized emphasis on basic elements like truth and justice, loyalty and love. Some years ago Winston Churchill summed it up better than I can. "Man in this moment of history," he said, "has emerged in greater supremacy over the forces of nature than has ever been dreamed of before. He has it in his power to solve quite easily the problems of material existence. He has conquered the wild beasts, and he has even conquered the insects and the microbes. There lies before him, if he wishes, a golden age of peace and progress. All is in his hand. He has only to conquer his last and worst enemy—himself."

Who can best alert and guide humanity under the new conditions we face? I do not think that the scientist—concerned with physical forces, and the politician—dealing with men as he finds them, are adequate for this task. The challenge must be met primarily by Religion, which has the greatest responsibility and the finest opportunity to advance the good cause of Peace on Earth.

Man must be awakened to the fact that, as never before, he is his brother's keeper. The human race must be made aware that unethical conduct now amounts to race suicide—that man's true progress and real security are to be found in the principles of universal morality.

Science is coming close to providing a universal storehouse of plenty; but that will avail us nothing unless Religion leads mankind to practice the principles of universal morality.

The final test of Science is not whether its accomplishments add to our comfort, knowledge and power, but whether it adds to our dignity as men, our sense of truth and beauty. It is a test Science cannot pass alone and unaided. I dare to suggest that the major burden rests on Religion—to show to all men and institutions the way to life based on a foundation of moral principles.

To provide a peaceful and happy life on this earth for all God's children, Science alone is not enough. Man's yearnings require the satisfactions he receives from Religion. Today, both Religion and Science have vital roles to play. They must play them together in a common effort.

When a man reaches the position in life when he begins to receive plaques, awards and medals, the temptation is to reminisce. And oh, how some people hate to have you do it—even your own family when you tell what you did when you were their age.

Sometimes fathers are criticized—particularly if they head public corporations as distinguished from private organizations—for having members of their own family in the same business in positions of responsibility. I have thought a good deal about this and I have developed my own philosophy. Several years ago, I sat next to a great man who is the head of a great organization, one of the largest in the United States. I knew he had a son, and I asked what the boy was doing. He said his son had a lot of ability, but he was working for a competing organization as an engineer. He was doing fairly well, but not anything to write home about. I said, "Why don't you have him in your own business, the business that you have spent your life in and one that is at the top of the engineering profession?" "Well," he said, "I have always made it a policy not to have anyone related to me in my business." I said, "Well now, you are touching upon a subject in which I am vitally interested and I would like to know your philosophy." He had no philosophy, so I said I would like to give him mine. Mine is that when a man stands in the way of his own son's progress, he is not thinking of the son. He is thinking of himself. He is apprehensive about criticism which might be levied against him. Now, if what you do, or fail to do, is done on behalf of your son, I applaud it. If, however, what you do, or fail to do, is done to save yourself from possible criticism by some uninformed person who refuses to recognize that your son's ability had better be used for your company's benefit than that of a competitor, then I don't think you merit any applause. And he said, "You know, you have given me an idea. I hadn't thought about that." I suggest that fathers have no more right to stand in the way of their sons' progress than the sons have the right to stand in the way of progress of their fathers.

A man's practical achievements, his intellectual stature, his place in his community, and his position in his profession, often are related to the major events that occur during his lifetime.

The demands for independence and the tide of "rising expectations" have produced economic, financial, political, technological and social effects and conditions that have ignored history and reshaped geography. To be able to reorient one's thinking, to accommodate one's attitudes and actions to such gigantic developments and rapid changes, to maintain clear vision, to lead in an atmosphere often beclouded by uncertainty, and to retain firm faith in God and country and mankind—these are attributes possessed by few. They call for mental vigor, intellectual perception, dedicated patriotism, unimpeachable character and mature wisdom.

Our brain needs exercise as well as our muscles. A great many people don't go beyond today. If things are going along all right today, they are not thinking about five years from now or ten years from now or twenty years from now. Perhaps in some cases it's well they don't, but in the majority of cases those who are inclined to be analytical, to dig for facts, to study in depth rather than just on the surface, develop a sense of looking forward.

*A frequent participant in Washington policy discussions, General Sarnoff is a recipient of Presidential Citations for "services of inestimable value to the war effort." In 1954, Sarnoff visited the White House office of President Dwight D. Eisenhower, under whom he served as a Colonel at SHAEF headquarters in Europe during World War II. Both are eminent recipients of the Wisdom Award of Honor, and each was paid tribute by the Editors of Wisdom with the publication of a special edition of Wisdom Magazine.*

David Sarnoff has devoted his life to the realization of his ideals which he believes to be for the good of his fellow citizens and for the whole of mankind. He is a leader in the advancement of civilization. His name belongs among the greatest names in world history. The impact of his contributions to the various fields of his activity will remain for the future historians to evaluate. For the present, we can only say that David Sarnoff is a blessing to all the forces striving for peace, progress and democracy.

Winston S. Churchill

WINSTON S. CHURCHILL
*Former Prime Minister of England*

*Sir Winston Leonard Spencer Churchill (opposite page), British Prime Minister, soldier, journalist, author, adventurer, orator, historian, statesman, painter, biographer, Nobel Prize winner, and one of the greatest Englishmen who ever lived, was a world leader without equal in all history and a legend in his own lifetime. A brilliant man of knowledge and education, genius and wisdom, he was one of the great men of our time who inspired and encouraged the creation and publication of Wisdom Magazine. Churchill, an eminent recipient of the Wisdom Award of Honor, collaborated with the Editors of Wisdom on a special edition which was devoted to his wisdom and published in tribute to his magnificent achievements in many fields of human endeavor.*

Lord Halifax once remarked that "service is the rent that we pay for our room on earth." For most of my years, it has been my good fortune and high privilege to pay this rental, at least in part, to the greatest city in the greatest nation on earth, the city of my adoption—New York.

New York—magnificent city, eternally youthful and energetic—is in a genuine sense the center of the twentieth century world. Nowhere else do the prevailing winds blow more favorably for innovation, for free inquiry, for unhampered access to the best of contemporary thought. This is particularly true in the field in which I have labored for more than half a century—communications. It happens to be a field in which science and technology and the creative arts meet and interact. And all of them flourish in the intellectual and moral climate of New York, nourished by the city's tolerance and human diversity, by its cultural riches and dynamic power.

It is primarily in New York that the decisive advances of modern communications have taken root and grown to fruition. This extraordinary city stimulated the brains, the imagination and the organizing skills that turned wireless telegraphy into radio broadcasting, then added sight to sound, and finally added color to sight. It is no accident that New York is the home of all the major national broadcasting networks. It was here in 1926 that the first nationwide radio network—the National Broadcasting Company—was started. It was here in 1939 that black-and-white television was introduced at the World's Fair. It was here in 1954 that color television was first presented to the public on a regular programming schedule. It was here in 1956 that video magnetic tape made its "on the air" debut. But significant as these developments were, they have been only a prelude to what New York will experience in the decade ahead. So swiftly do we accelerate the future that the world of ten years ago already seems as remote as that ancient time when the telephone and the radio were startling novelties. Ten years hence, the world of today will seem equally remote.

Beyond question, New York has the brainpower and the facilities that guarantee a continuing position of intellectual, scientific and spiritual leadership. Happily, it also has the wisdom to safeguard and stimulate that progress. And it is truly dedicated to preserving and expanding the freedoms which enable men of all creeds and races to work together in a marvelous interplay of ideas and action. For all those who live and work and serve in this great city of cosmopolitan culture, these words of John Dewey, New York's own philosopher, have a special meaning: "The future is not ominous but a promise; it surrounds the present like a halo."

Perhaps fear and the soul-searching it induces, are hopeful signs—even though this awareness comes at this late hour. Many more people now sense the need of a moral compass to steer by, if only because they recognize that today a single blundering act may prove fatal to our civilization, if not to the continuance of the race of man.

It has been said that the three essential pillars of civilization are Religion, Art and Science—the everlasting search, to put it another way, for Salvation, Beauty and Knowledge. The concept of three pillars is useful for everyday conduct of work and inquiry. But it need not be taken literally. For in truth, Religion, Art and Science are but different aspects of the same reality, rooted in the same supreme mystery of being.

The greatest geniuses, whether they expressed themselves through art or philosophy or inspired prophecy, cannot be identified by any one limited label. Leonardo da Vinci was as much the poet in his scientific investigations as in his painting. Goethe's universal mind embraced the science of the time, and his *Faust* is a moral tract no less than a work of literature.

There is a common and unifying element—what we identify instinctively as the "divine spark"—in a Raphael Madonna, a Beethoven symphony, a discovery by Copernicus, Newton or Einstein. All of them drew inspiration from some common reservoir of spiritual vitality. All involves moments of flashing intuition that call to mind the Burning Bush that spoke unto Moses. The experience of sudden inner illumination beyond mere intelligence, known to mystics and martyrs and poets, is not unknown to creative scientists and inventors.

That Religion and Art are related and flow from the same wellhead in the human soul, has been accepted. We need only to think of the Prophets, or supreme examples of religious music and painting, to see their intimate relationship. And some of the foremost thinkers among scientists and theologians have recognized that Religion and Science also are closely related. As the horizons of Science have advanced, many of its great practitioners have become more humble, not less. More reverent, not less. They do not view as mere "accidents" the Natural Laws that govern the behavior of the Universe—the Sun, the Stars, the Moon, the Tides—all working in perfect harmony. From the infinitesimal atom to the infinite cosmos, they perceive a consistent pattern of form and behavior.

The more deeply scientists delve into the heart of nature, the more awe-struck they stand in the face of ineluctable mysteries. Beyond the frontiers of Science, no matter how far or how fast these advance, the scientist and the poet and the religious man meet on common ground—the common ground of the ultimate, unanswerable questions.

Scientists know how a natural force like electricity, or magnetism, or gravitation, works. But they do not know what it is or why it works as it does.

The crowding advances made by Science pose urgent problems and a

challenge to Religion. Much of the tension in our world today can be traced to the failure of moral and religious power to keep pace with the multiplication of physical power. In forms more acute than ever in the past, we confront the ancient contest between flesh and spirit.

The awareness of the disparity between flesh and spirit is not new. Benjamin Franklin, whose amazing mind was equally at home in ethics, esthetics and technology, voiced a complaint that has been echoed by perceptive men in every generation. "The rapid progress true Science now makes," Franklin declared, "occasions my regretting sometimes that I was born so soon. It is impossible to imagine the height to which may be carried, in a thousand years, the power of man over matter. O that the moral Science were in as fair a way of improvement, that men would cease to be wolves to one another, and that human beings would at length learn what they now improperly call humanity." Not a thousand, but only 177 years after his death, that "power over matter" exceeds by far what Franklin gropingly imagined.

The gap between technological and moral Science has not been closed but widened. Though we have learned to control much of nature, we have failed to master ourselves.

Mortal man, it appears, is ill at ease among the immense forces he has summoned from the deep. The dust stirred up by the march of progress gets into his eyes and blurs his vision. And the inner light that should guide him is also obscured. Lacking guidance, confused and skeptical, he feels himself a child playing with matches—nuclear matches—and he grows afraid.

I never was satisfied with a problem that I understood only partly. I wanted to understand it as completely as I could.

I think you must be willing and able to listen as well as to hold forth, and to select people for whose judgment you have respect and from whom you can learn. There was always in my youth, in particular, an avid desire to learn and to acquire information. The people I was fortunate to get to know and to associate with—men like Professor Michael Pupin, Howard Armstrong, Lee De Forest and especially Marconi and the people around him—they were people who had imagination as well as knowledge. I spent most of my time with that type of people, and in talking with them and listening to them my own imagination was stimulated and stretched.

You must be willing to stick your neck out and say, "This is what I see and this is what I believe in and this is what will come to pass." So, I would say that this legend that has grown around my so-called vision is nothing extraordinary, nothing phenomenal. It's hard work.

It is almost impossible for a successful man in the United States to tell a story without first touching on his difficult start as a newsboy, a messenger boy, a delivery boy or a telegraph operator. Apparently, it is hard to be a success unless you started that way. I belong to the school that Al Smith used to initial after his name when he spoke at a university. Others put their degrees alongside their names, such as LL.D. or D.SC., but he always put Al Smith, F.F.M. When they asked what that represented, he said, "Fulton Fish Market."

When I contemplate the future, it is with the same feeling of awe that Cortez must have experienced standing on a mountain peak and viewing the limitless expanse of a new ocean. Only thirty-three years from now, when a new century dawns we will be citizens not only of a nation and of a world, but of a communicating planetary system and conceivably even of a cosmic society. Beyond question, we will live through an age that has not been rivaled in adventure for nearly five hundred years, not since an Italian-born navigator waded ashore on a Caribbean island to lay claim to a new world.

For the first time in human history it is possible to foretell with some degree of exactitude the shape of things to come. In no way that I can identify are we more intelligent than our ancestors, but we are vastly more knowledgeable. What we have done is to organize our knowledge into a coherent pattern, view it in terms of clearly visualized objectives, and utilize it for specific results. Moreover, we are doing this on a scale that in science, at least, dwarfs the sum of all man's previous efforts.

We begin to see where we are going, what is needed to get us there, and how we can generate the means to reach our ends. These ends are to turn the great natural forces of life, matter and energy—from the invisible to the infinite—to human benefit.

In the tenth year of the Space Age we know that much of the information we have long sought lies in the vastness beyond the atmosphere. We have reason to hope that, as we penetrate and explore this void, we may at last find answers to profound secrets that have always tantalized man —the origin of our world, the nature of gravity, the riddle of life, and whether we are members of a cosmos in which there are perhaps millions of inhabited planets in solar orbits such as our own.

The future lies not only in the stars but also in ourselves. What happens in space will affect and, in some instances, dominate our lives on earth. Even now we can see the outlines forming. Man's ways—his modes of work and habits of living, the scope of his thinking, his means of communication and transport, his techniques of learning, his health, his life and his outlook on life—all will be fundamentally altered by space. He will be less subject to the whims of nature, for he will be able to foresee and, to an extent, control some of these whims. Both space and time will

be radically shrunk and in some respects virtually eliminated. As the most intrepid of his fellows venture further into the universe, he will have the universe brought within closer reach. Man's concepts of himself and his place in the cosmos will be profoundly revolutionized.

Space will become a vital factor in the national economy, perhaps the dominant one. Already more than 5000 companies and research organizations are engaged in civilian and military space activities, producing thousands of different products related to space enterprises. They range the spectrum of major industries—electronics and communications, metals and fuels, machinery and instruments, chemistry, plastics, ceramics, textiles, and scores of others—whose technology will penetrate every corner of the economy.

We will see new materials, devices, products, power sources, control and communication systems, designed originally for space purposes, changing our methods of production, distribution and consumption. They will be lightweight, compact, durable and reliable in the extreme. Many will operate themselves or other systems for long periods, over great distances, frequently without supervision, repair or replenishment—in factories, offices, homes and remote places.

With other nations, particularly in Western Europe, speeding their economic development at an unprecedented rate, our space technology may well be the means of keeping this nation in the competitive forefront. As automation gains momentum, space activities will generate new jobs and careers at the craftsman, technician and professional level. If the millennium of true disarmament ever arrives, space may be the instrument for diverting the energies devoted to weaponry to a new and higher economic effort.

A fundamental development for all of us on earth will be new power sources, many of them converting energy directly to electricity. Sun-powered batteries, solar cells, fuel cells and small atomic reactors will power many industrial and home operations, remote installations and areas in underdeveloped countries, without the need for major installations or transmission systems. As rocket systems are perfected and costs are reduced, it is possible to foresee the transport of cargo across continents and oceans within minutes. Types of transport being developed for exploration of the moon and possibly beyond, may provide the means for radically new forms of earth travel. Whether they operate by air cushion, powered by nuclear energy, or fuel cell, these new vehicles would traverse any type of terrain, completely independent of roads.

Will all the new Space Age developments already in process, and ahead of us, alter man's own destiny on this planet? I think not. Much has been written, for example, about electronic computers—our new thinking machines. They are remarkable in their ability to receive,

record, analyze and, in certain conditions, act upon volumes of data. The requirements of the Space Age will greatly accelerate the development of these instruments—far swifter and more versatile than any in use today. It is very likely that in time we shall create still greater computer capabilities—some of them with characteristics similar to our own thought processes. These machines may be capable of repairing and even reproducing themselves. When this happens, it has been suggested that man might well pack his suitcase and quietly tiptoe away, leaving the world to the mechanisms designed for coping with it.

The human spirit should not quail in contemplating the millions of galaxies, their hundreds of billions of stars, and the probability of intelligent life elsewhere. We have progressed from family to clan, to tribe, to nation and now to community of nations, yet for us, at least, the individual still reigns supreme. Are we in any way diminished by the knowledge that we may be citizens of a cosmos as well as a world? I do not think so. If we are awed by infinity, why should we not be equally awed by the symmetry of a snowflake, or in Blake's words: "To see the world in a grain of sand"?

More significant perhaps than the knowledge we acquire is the sense of wonderment and the majesty of space. After the explorers and the scientists will come the theologians, writers, doctors, lawyers, musicians, philosophers and scholars to bring deeper insights and understanding to the discoveries. For many the Space Age will provide careers that have as yet neither name nor description. This new world will be wide and deep enough for all to find places in it.

We must not set our ways or our minds too fixedly. This ancient worl of ours is stirring with fresh vitality. It will call for all the audacity o our minds and spirits, and all the learning we have acquired. It will bring out the finest in our pioneering heritage—to seek and find new ways and if need be, to make them.

It is not enough to train young people merely to be able to earn a living, as Abraham Lincoln said. It is what you do with your living after you earn it that counts.

I think the first and foremost ingredient of leadership is to have confidence in yourself. If you lack confidence in yourself, you won't have confidence in other people either. Having confidence in yourself must stop short of arrogance. You must not be so confident that you believe yours is the only view. On the other hand, you must have enough confidence in yourself, after you have formulated an idea or an opinion and have subjected it to criticism and scrutiny and gotten a hundred reasons why it can't be done, to make the decision and to proceed on the basis of what you really believe in. That is leadership. The lack of leadership is where a fellow might have wonderful ideas, but after he puts them

through the wringer he gets confused. He is reluctant to go forward in light of the objections and the risks and the uncertainties. That is the difference between leadership and lack of it.

I don't think there is a formula for success, however glib it may sound or however well it may read, because there are so many things relating to success over which one has no control. For example, you have nothing to say about who your parents are, and they certainly have an influence on your life. You have nothing to say about where you are going to be born. Suppose my parents had not migrated from where I was born in Russia to the United States. I would possibly today have been a victim in a concentration camp or been sent to Siberia. Or I might even have been a commissar. But certainly I give the greatest measure of credit for such success as I may have achieved to the opportunity this country provided—greater than any other country in the world, in my judgment, and I have been around a good deal. A man can achieve success here regardless of his beginnings or his background or his race or religion.

The freedom to express whatever forces you may be endowed with or are able to develop is the most precious thing an individual can have. It is worth fighting for and dying for.

Even though we live in a world where hunches are not the thing to depend on for our plans and programs, I do not exclude the possible value of hunches. A hunch can be a primitive reaction from a person who has no education and knowledge, no information and no experience. That's not the kind of hunch I am thinking about. The hunch that means more to me is the accumulation of knowledge, the accumulation of experience, and a sense of feel that somehow gets stowed away in your memory. You fill the human brain with facts and information. Then you call on it and out comes an idea, or a thought, or a resolution, or a program or a diagram. It's based on all this that you have accumulated, and you call it a hunch. That's the kind of hunch some people have and some haven't.

Recently I was invited to give an inspirational talk. Now I don't know what an inspirational talk really is, because a speaker may be inspired and the listeners may feel perspired. Inspiration is a quality that must come from within. If you are inspired by what you hear, it often has a very temporary and transitory effect. You may be inspired while you are listening, and when it's all over, it is hard to remember the basis of the inspiration.

When I blow up occasionally, as I do, or when I reflect upon what may have happened in the morning or yesterday, and recognize that in some respects my impressions or my expressions may not have been fully justified, I don't feel good about it. That is something I think each person should bear in mind. We may indulge in the luxury of criticism, of faultfinding, and at times it is necessary and justified, but we must

not enjoy it. There is the difference between the fellow who calls another one down and puts him in his place—and gets a thrill from the possession of power and prestige that his position may give him, and thinks he's really a big guy—and the man who does it in the sense that a father spanks his child occasionally but regrets the necessity for it.

Mature men must exercise tolerance and understanding in their appraisal of other men. We can't all be everything. The real test of an executive is his ability to extract the good qualities from a man, and to make him work and recognize that he may also have some undesirable qualities that need correction. Each of us has blind spots, each has defects, but it's the net balance that determines the final value.

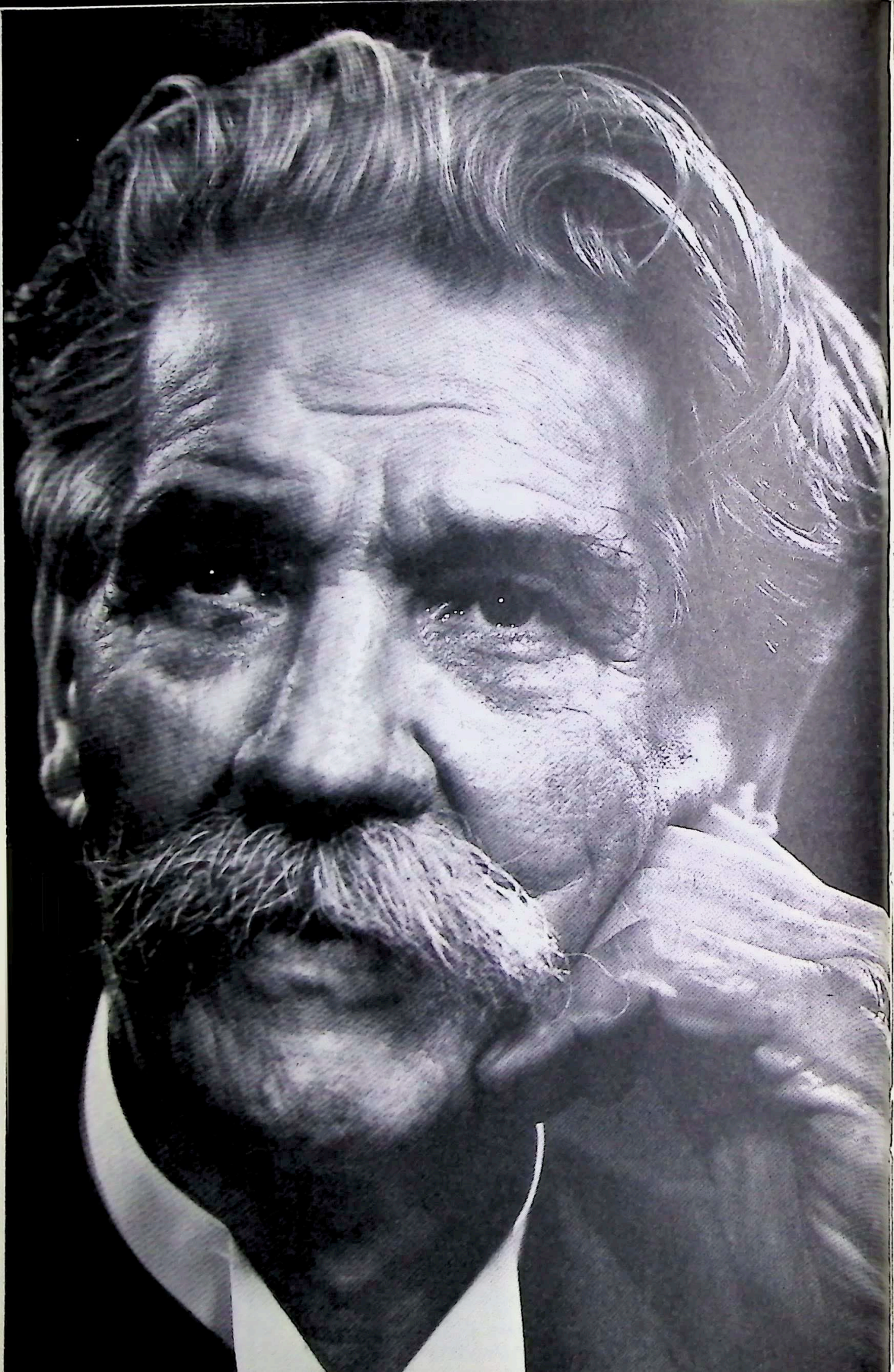
We must concentrate on the problems of the present without disregarding the possibilities and prospects of the future. But too many of us are often fascinated by the vision and dream of tomorrow. It excites our imagination and challenges our interest to a degree which takes from the problem of today the attention and the concentration that it needs.

We must not be sloppy with ourselves. We must not be satisfied with what we do and say, "Oh, this is the best I can do, I am not going to worry about it. I have done it." You can always do better and the reward is the fulfillment of your own abilities, your own forces with which the good Lord has endowed you. And then you must demand the best from the others. Demanding the best that another fellow has to give is not necessarily hitting him over the head with an axe. It need not be offensive. It is indeed complimentary when you believe that one is able to do better than he's doing, that he has greater capacity than he has expressed When you make that clear, you have complimented a man and you hav helped him to develop. You have helped to bring out the latent force within him.

Never before has economic statesmanship, on the part of leaders of management and of labor, been more essential. Fortunately we have, together, already mapped out vast areas of agreement and common interest. Our job is to protect those areas and constantly to enlarge them, so that we may confront and solve the inevitable problems of living together in a mood of mutual trust and respect.

Few memories are warmer and more enduring than those related to a man's work. For me, such memories are stirred by recollections of the early pioneers who have passed on, and by those with whom I have been associated over the years.

I wear my competitive scars with the pride of a veteran, for they have been earned on a great battlefield for a common cause—the advancement of the electronics art and sciences for the public benefit.



A great man is one who has done such work as no other man has done before him. And, who has in some way, considerably exalted the standard of excellence which he found existing. He is a man who has heightened for us our idea of the capabilities of our common nature—to see things hitherto invisible to others, and so to embody them so that, henceforth, others shall see them too; to attempt things heretofore impossible to others, and so to realize them so that, henceforth, others shall realize them too—either of these things is the characteristic of a great man. The greatest men have been able both to see and to do. They have combined in their characters, equally, insight and energy, elevation of mind and decision of will. David Sarnoff is truly such a man of greatness, who has undertaken great things for humanity because he is great. He stands on high ground, in virtue of his wide intelligence, his noble thoughts, his lofty character and his pure inspiration.

Albert Schweitzer

ALBERT SCHWEITZER, M.D.
*Physician, Philosopher and Author*

*Dr. Albert Schweitzer, physician, clergyman, philosopher, theologian, author, jungle missionary, music scholar, Nobel Peace Prize winner, and one of the greatest creative thinkers and humanitarians of our time. An eminent recipient of the Wisdom Award of Honor, and one of the notable world figures who inspired and encouraged the creation and publication of Wisdom Magazine, he collaborated with the Editors of Wisdom on a special edition which was devoted to his wisdom and published in tribute to his magnificent achievements in*

I am grateful to the very depths of my being for sixty years of challenge and adventure such as few men have been privileged to enjoy.

The twentieth century has opened up thrilling continents of knowledge and vaulted horizons of power. Never before has man's physical environment been so radically and so rapidly modified. Those of us who have made some slight contribution to the record are aware of the dangers implicit in our achievements. This awareness is in itself an indication that we have not forgotten the great guiding spiritual principles without which any segment of time is barren.

Oliver Wendell Holmes—not the great Justice but his father, the "autocrat of the breakfast-table"—once divided men into two types—those who gaze through telescopes and those who peer through microscopes. Some of us are fascinated by mysteries too vast, others by mysteries too small, to be seen with the naked eye.

In the childhood of mankind, thousands of years elapsed between major advances—between the first crude tools and the wheel, for instance. It took centuries to release the power entrapped in wood and falling water, then in coal and oil. Even in modern times, progress so headlong that we called it an industrial revolution, actually required many generations as the age of steam moved into the age of electricity. The unique and fateful fact about the last sixty years is the dizzy speed with which a multitude of shattering changes have come upon us. Hardly had mankind gotten over the shock of one tremendous discovery when it was staggered by another and usually bigger one. Small wonder, therefore, that we have been bewildered and a little scared. The terrific acceleration of life has subjected us to immense strains, which at times seemed almost intolerable. We are most acutely conscious of this just now in our reactions to atomic energy.

The inability of man as a social and economic creature to keep step with his science—that is the crux of his dilemma today. He is mature technologically while still an adolescent spiritually. Physical distances have shrunk, but the distances between the hearts of men and of nations are wide as ever. This is the primary challenge that faces mankind.

Having conquered nature, man faces the task of conquering himself. As Bernard Baruch put it once, "To attain the stability we yearn for in this world, we must first find stability within ourselves." Not until this happens shall we be truly integrated and whole. We see clearly the potential of menace in every potential of opportunity. It is, in modern guise, the ageless legend of Prometheus, who gave man the double-edged gift of fire that both consumes and warms. So we tend to be frightened by our own handiwork. But this, surely, does not mean that we should reject that handiwork, even if it were within our power to do so. Our choice is between accepting the challenge or allowing ourselves to be crushed by

it. We can grovel in terror before the mighty forces released by science, even as savage man groveled before lightning. Or we can face those forces boldly and harness them to our purposes, just as electricity has been harnessed for mankind. That choice is what makes this a time for courage and for leadership.

The thesis that there is an inherent conflict between science and our immortal souls is simply untrue. The Atom is not the natural enemy of the Adam. Indeed, it can serve as his greatest helpmate. The man in an airplane is not necessarily less devoted to truth, justice, charity and other such essentials than his forefathers in oxcarts. Virtue does not of necessity go hand-in-hand with primitive plumbing, and nobility can be found in a skyscraper no less than in a log cabin.

It has been said that to know the future one must study the past. But what is past is prologue. Our studies of history have shown us that human nature does not change much; that human traits and habits follow a similar pattern from generation to generation.

Man cannot hope to control the behavior of the atom until he learns to control himself, in a constricted world where one man's madness can make millions mourn. There might be an atom bomb in your home, but it would remain harmless unless man in his confusion and desperation pulled the trigger. If the civilization we cherish is to survive, the hand that controls the atom must be guided by understanding and good will —not by hate, but by love of mankind.

Along with the assembly line has also come the rise of trade unions and a more equitable sharing of the fruits of labor. Though consumption of goods per person has risen two and a half times in the last sixty years, the average work week has been reduced by one-third. At the same time, the possibilities for worthwhile and enjoyable use of these new margins of leisure have been immeasurably enlarged. We have no excuse for defeatism in the face of science. We have no warrant for despair. In the electronic and atomic age, man's hunger for freedom and social justice, for beauty and inner grace, is as keen as ever. This hunger is at the core of his being, unchanging through all external changes. Three times in this century, when we believed that tyranny threatened mankind, free men have rallied to defend age-old values. There is no cause for jitters as long as we hold fast to the certainty that material progress is not an end in itself but a means to a fuller, nobler, more satisfying life.

It seems to me good that some of the weight of arduous toil has been unloaded onto the backs of machines; that medicine has reduced the sum-total of pain and agony; that the wonders of communication have brought peoples and nations into closer contact, so that one day all may share their cultural wealth. The material triumphs can and will be translated into a happier existence for hundreds of millions of God's

children. The job ahead is to assimilate the scientific progress, to turn every potential for human benefit into a living reality.

Sound ideas and daring leaders are in greater demand today than ever before. Let us make the most of the fact that experimentation, in the scientific and social areas alike, is no longer frowned upon. Let us accept the fact that the only certainty in our lives, will be change—and we will be in a better position to assimilate it without mental indigestion and moral confusion.

Let us not lose the sense of the awe and mystery of life. Our very triumphs in penetrating nature have disclosed our mortal limitations. The more we learn, the more remains to be learned. Science, far from making us arrogant, teaches us to be humble. In this universe of endless wonders, the most wondrous is the human mind capable of delving so deep, and the human heart aware of depths we can never plumb.

My mother used to describe her four sons in a way that has become a family classic. One of them she identified as the smartest, the other as the kindest, the third as the handsomest. Obviously none of these was me. Then she would conclude the inventory by adding, "And David is lucky!"

I have never underrated the element of luck in what passes for worldly success. I know it takes more than luck alone, but I do not hesitate to acknowledge that I have been lucky beyond my deserts. It was luck that my parents had the pioneering instinct and the good sense to bring me to this glorious land of freedom and the opportunity that goes with freedom. It was luck that for me that opportunity materialized in an art and an industry even younger than myself.

More than ever in the past, man will be called upon to discipline himself and the world he lives in, and remain true to ideals of human welfare and moral integrity. Already the human race has at its disposal the power to destroy in a moment what it would take many years to rebuild. And the precious lives that would be extinguished could never be rebuilt. Wisdom and courage of the highest order are called for to guide this new-found power into constructive rather than destructive channels. And those of us who have had a role in generating that awesome power have also an obligation to do our utmost to make it a beneficent force.

I have always been more concerned with the future than the past.

A historian has said that "often do the spirits of great events stride on before the events, and in today already walks tomorrow." Never before was this insight truer or more meaningful than it is today. The tomor-

rows ahead of us will be crowded with great challenge and great opportunity. They will be crowded, too, with great dangers.

In our modern society truth does not have easy sailing. In our social customs, in our business dealings, in our daily life, we constantly encounter compromises with truth. We see truth impeded at every turn. A generation ago a play entitled, *Nothing but the Truth,* met with phenomenal success on Broadway. While it was an extreme and humorous treatment of the subject, it nevertheless carried a pointed lesson. It pictured in sharp focus how loosely we deal with the truth; how often we do not say what we mean or mean what we say; how prone we are to shape the truth to serve our selfish interests. How far we can go in compromising the truth without actually violating it, is a nice question. From compromise to violation is not a long step. Every one of us must face this issue in ordering our own lives.

We are daily exposed to flagrant distortions of truth in advertising. Distasteful though they are, we listen to all kinds of extravagances, exaggerations, superlatives, unsupportable claims and twistings of the truth—and have come to accept them as a necessary evil. Who can escape from the moronic commercials which peddle this rejuvenating patent medicine or that particular brand of beer or cigarettes? Resignedly we sigh and wait for our favorite program to come on the television screen. This is not a blanket condemnation of advertising. Happily, for every bad advertisement there are two good ones, conceived and presented on a high ethical plane. But how to defend ourselves against the demoralizing effects of the bad ones constitutes a major social problem

Some years ago, there was a campaign to stress "truth in advertising." Doubtless it accomplished a great deal of good, but we can hardly say it was a complete success. I have no quarrel with any individual advertiser, but my concern is with the great bulk of advertisements which distort, confuse and misrepresent the truth. Such advertising, to which millions of minds—young and old—are daily exposed, cultivates and sets certain ethical and social standards which do not reflect the integrity we must have if our free democratic institutions are to survive.

One area where the truth is not always given a fair deal, is in the press. This is no criticism of the press as an institution. Freedom of the press is one of the great safeguards of democracy, but this is true only so long as the press handles news fearlessly and impartially, so long as its editorial comment is based upon facts impartially judged. Unfortunately, news is not always handled that way. Whether or not by design, news stories are often given a certain slant which leaves an erroneous impression—an impression that may be difficult if not impossible to correct. I realize how difficult it is for a reporter always to get a complete and accurate story while meeting a deadline, and I have nothing but praise for those newspapers which consistently strive for this ideal. But when a newspaper becomes a propaganda organ designed to give only partial

information, in order to promote or protect some special interest, then it fails in its obligation to society and is no longer worthy of membership in the free press of a free land.

"The bigger the lie, and the more often it is told, the more likely it is to be believed," is a theory attributed to Adolph Hitler. Unhappily it appears at times to be all too true, and propaganda, developed on this basis, has its devastating effect. While our laws protect the individual against libel, the winning of a lawsuit is hardly an adequate compensation for the harm already done, for defamation of character, and for the agony of mind and of spirit engendered by the publishing of untruths.

Truth is too often sacrificed in the responsibility of persons in authority, be they public officials responsible to the electorate or officers of organizations responsible to the membership. Withholding of true facts may serve as a cloak of corruption. Some time ago, in one of our largest labor unions, we had an example of such corruption. It was only when the searchlight of investigation disclosed to the public the ugly truth, that the members who had been victimized were freed from the toils of unscrupulous power—an example of how the revelation of truth does engender freedom. The role of the Fifth Amendment in situations like this can easily be misunderstood. Its provisions are essential for the protection of human rights. But it is intended to protect the honest person who may be unjustly accused against tyrannical authority. It is not intended to serve as a refuge from justice for the guilty, even though, at times, it may have that effect.

The facts of physical science do not constitute the whole body of truth. The power of the human spirit transcends physical power, and in the end will rule it. Hence our search for the truth must include also the realm of the spirit. Man's spiritual power will determine whether atomic energy shall be the means of wiping out the human race, or whether it shall raise mankind to a higher level of achievement. If the latter, then God's truth indeed will make man free.

The law of truth and of freedom is something which operates in our individual lives. Knowledge is the foundation of a free mind and a free spirit in each of us. The more we know and accept the truth about ourselves, the more easily we can exercise free will and live as free agents. Ignorant of the true facts about our health, our capacity, our ability and our environment, we may readily become the slaves of fear and of worry. Even if the truth is unpleasant and hard to accept, it is better to know it and to adjust our lives accordingly.

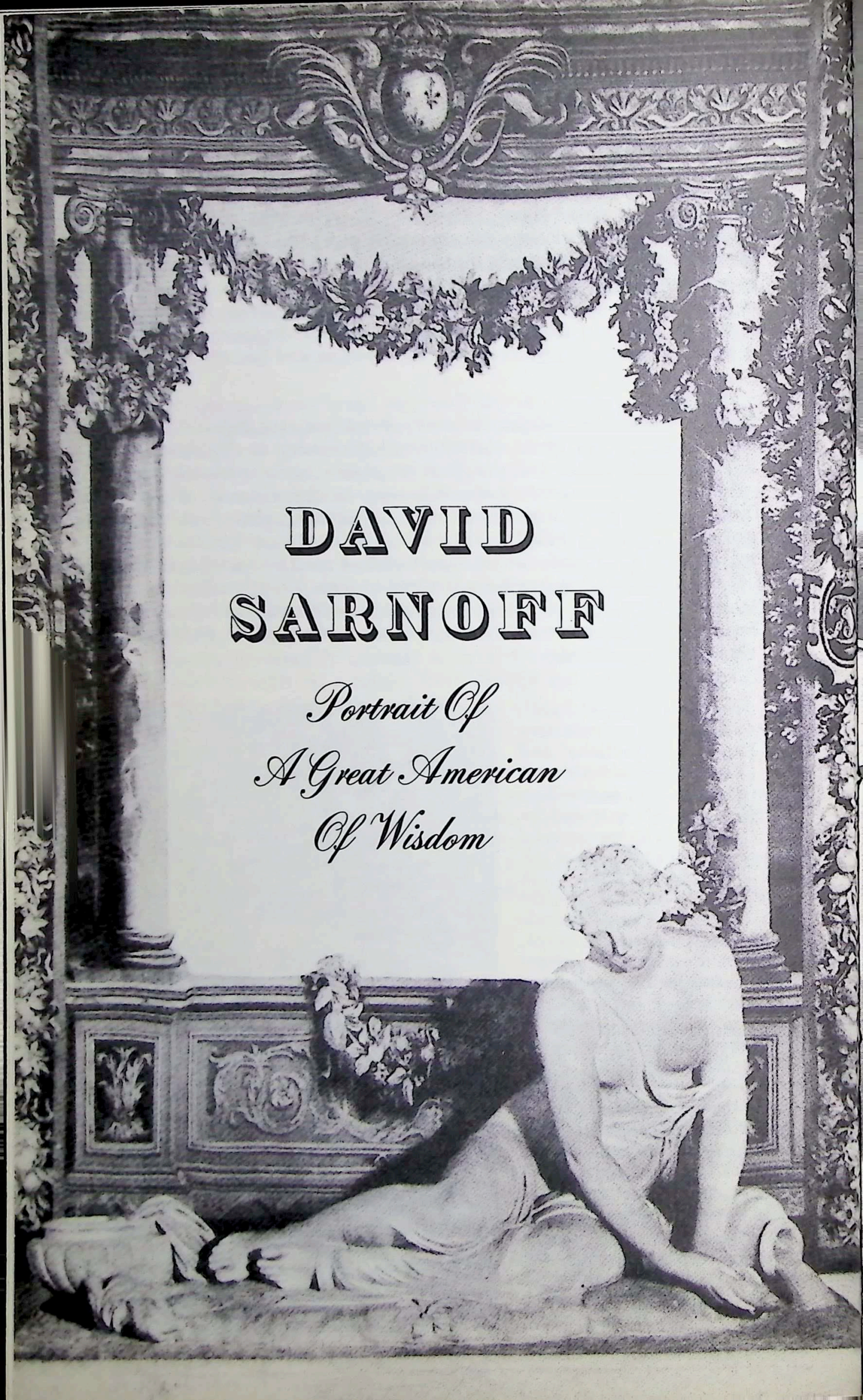
Not only do we need to seek and discover the truth; we must understand the truth, accept it and live it. In the passage in *Hamlet* where Polonius was giving advice to his son Laertes, about to depart for a journey abroad, he said, "This above all, to thine own self be true—and it must

follow as the night, the day—Thou can'st not then be false to any man." This is another way of saying, "Live the truth, if you would enjoy the full freedom of mind and soul." For therein lies the key to personal health, and to a happy and successful life.

The time is past when nations could reasonably expect to muddle through, to drift without planning and guidance. In this crucial period of transition, the pressing need, as I see it, is for statesmanship, not merely in government and diplomacy, but in every phase of life. We must have statesmanship of a high order that will recognize the vital importance of human relations and provide wise leadership for business and labor, education and recreation, the sciences and the arts.

Science begets humility. Its every discovery reveals more clearly the Divine design in nature, the remarkable harmony in all things, from the infinitesimal to the infinite, that surpasses mortal understanding. The physical processes and laws of the universe are logical, all-embracing and wholly dependable. They imply a Supreme Architect, and the beauty and symmetry of His handiwork inspire reverence. It may be that the imperfection of man, too, is a part of that creative symphony. The seed of moral perfection has been planted in man, but it has been left to him to nurture it to full flower in the harsh soil of mortal existence. Thus man is given a positive role in carrying out a phase of the blueprint of the Supreme Architect.

*Norman Vincent Peale, America's famous Protestant "Minister to Millions" and one of the nation's most popular authors of best selling religious books is one of the notable clergymen who inspired and encouraged the creation and publication of Wisdom Magazine. Pastor of New York's historic Marble Collegiate Church, America's oldest Protestant institution, and a prominent spiritual leader, millions have been enriched and exalted by his writings and sermons. For many years, Dr. Peale conducted a daily program over the NBC radio network and a weekly television series in which he brought to many millions the practical wisdom of his lifetime of experience. An eminent recipient of the Wisdom Award of Honor, his inspiring words of wisdom and great thoughts have been published in Wisdom Magazine.*


DAVID
SARNOFF
Portrait Of
A Great American
Of Wisdom

David Sarnoff is a man of destiny. The most dynamic and commanding figure in American industry today, his is a voice which has deep roots in the past and still has the dynamic urges of both today and tomorrow. At the age of seventy-seven, when most men have long retired, Sarnoff is not permitted to retire. He seems ageless. He is young in ideas and has vigor and stamina beyond his years. From the days of his youth he has been a man of action, a fighter. In addition, he is that rare combination —a dreamer and a doer.

Many a younger man has wilted under the pressures Sarnoff has encountered in his more than sixty years of pioneering in the fields of radio, television, communications and electronics. Physically tough, with an almost inexhaustible fund of physical energy, Sarnoff has been the moving spirit and the dominant force of that tremendous and powerful corporation, RCA, since its founding in 1919. And he has presided over the development of radio and television, as well as all the other burgeoning wonders of the electronic age, with wisdom and immense personal prestige. To the advancement of modern communications and electronics, no single individual has contributed more brilliantly or with greater foresight than Brigadier General David Sarnoff.

A world figure in modern times, Sarnoff represents a great tradition in democratic institutions. The roots of the civilization he symbolizes are deep in a history and culture that respect the rights of man and that cater for his individuality. Thus, to write about Sarnoff is a difficult task. One does not know where to begin. He is a great citizen of the world, one of the true giants of this age, and one of the most admired Americans in the eyes of other nations. By the same token Sarnoff, as commander-in-chief of RCA, is one of the most powerful men in the country. H occupies a place among the distinguished names whose genius hav contributed to the well-being of the nation. He has functioned so remarl ably and in so many fields and capacities that his position today is unique not only in America but in the whole world.

Sarnoff's influence on American life cannot be measured in terms of day-to-day achievement. His name is synonymous with communications. And his intellectual integrity and vision through the years have made him the greatest leader in communications and electronics this country has ever had—and his contributions to these fields, the most dramatic and moving story of American industry. Today his toughest competitors must, if they are honest, admit that no other man in American business and industry has occupied so great and pre-eminent a position as David Sarnoff. Given his innate strength of character, the measure of Sarnoff's greatness of leadership can best be read in the measure of the foresight, nerve and judgment which he showed in guarding America's most vital interests in the crucible of war. And it is by that measure that the outstanding value of General Sarnoff's services in the international field can best be appraised. In this immortal service, he has with good reason regarded himself as a man of destiny.

But Sarnoff's predominance arises from many other things—outstanding service to the cause of freedom, and a high sense of purpose and intellectual attainments. In his veins runs the civilization of the Old World and the color of the New. He has "warmed both hands before the fire of life." He exercises more influence for world peace than any other American business leader. And, in an age of specialists, Sarnoff is a phenomenon. Imbued with all the enthusiasm and vigor and idealism

which have not deserted him even today, he may be regarded as a man whose interest in life has always been too great to specialize in any one thing or whose brain and energy is so remarkable that he has been able to specialize in every subject that has interested him. He has a strong sense of the dignity and the importance of his position in the life of the country. Few lives can show an equal record of success in the pursuit of important good causes to which, at many times, the opposition seemed insuperable.

To be supremely good in one particular field of human endeavor is the most that the highly gifted individual can normally expect or achieve. But David Sarnoff is a law unto himself in this as in so many other matters. He seems scarcely to be bound by the limitations that enclose the lives of ordinary men. He stands out from his contemporaries as a great and resplendent figure with none to rival him in his many-sidedness. He has many of the elements of greatness about him. His stature has grown enormously in the outside world. For here is a man who can "walk with kings nor lose the common touch." He is a man of determination. When he has once set his heart on a particular objective, he will work for it for all he is worth and will not count any sacrifice too great for it. His mind reaches out to the ends of the universe and his heart overflows with concern for the peace of the world and the well-being of humanity. The truth is Sarnoff is not only the exponent of the dreams deeply nestled in the hearts of the people of America, he is also the expression of human conscience itself, particularly for people who lived more or less through the same early experiences and faced the same problems as he did.

Great men of the eminence of David Sarnoff do not easily lend themselves to a balanced appraisal of their personality and achievements. How does one approach the difficult task of delineating a brilliant man of such "infinite variety" as Sarnoff? Should one see him as an industrial statesman? A practical scientist? A creative engineer? A business leader? A courageous soldier? An inspired educator? A patron of the arts? A distinguished philanthropist? An eminent humanitarian? Should one see him as a dreamer who made his dreams come true? It should be remembered, also, that the seventy-seven years of Sarnoff's life represent an extremely important period in the history of the modern world. In many respects, especially in the fields of science, radio, television and electronics, and the liberation of the human mind, this period is unique in its achievements. From the point of history, had Sarnoff chosen some other career, the whole course of his life and not a little of the history of America and the world might have been different.

Today, as Chairman of the Board of the over three billion dollar a year Radio Corporation of America (when he started with RCA, it did less than two million dollars a year), Brigadier General David Sarnoff heads up the biggest single radio-television-electronics empire in the world. The diversity of RCA's interests is almost staggering. Altogether, it employs 124,000 people in twenty-eight manufacturing plants in the United States and fifteen plants overseas. Sarnoff's work at this massive organization calls out every ounce of his resources of energy, intellect and will, so that observing him one could say, here is a man living to the very widest extent of the full scope of his being. As a leader of a great industry, what he says and does is of supreme importance to the nation. At RCA, especially with the many thousands of problems that it has had to face since its founding, the office of the Chairman of the Board involves

strains and stresses which would have overwhelmed anyone less robust and strong, both physically and intellectually, than Sarnoff. But Sarnoff has succeeded for many years not only as the unchallenged leader of RCA, but as an industrial statesman whose international status has grown immensely with the passage of time.

Sarnoff is essentially a man of the future, although his mind seems to contain the accumulated wisdom of the ages. He is a man who is half-a-century ahead of his time, and with whom possibly it is difficult for most of his co-workers to keep pace. Possessed of an extraordinarily wide field of opinion which enables him to see the whole background of a complicated situation, he devised techniques which enabled RCA to march ahead irrespective of the many obstacles that it had to face and the many drawbacks from which it suffered in its earlier years. But his path has not been smooth. There have been problems and controversies over small and big things constantly creating new obstacles and difficulties. He has, of course, made mistakes. No one who does great things does not make them. But he is the first to admit his mistakes and make amends. He is cautious as he is bold. And he watches his company's activities with a fairly prudent eye. It has been his will power, his infinite resourcefulness, his ability to surround himself with other gifted men, to secure their loyalty and to inspire them to believe in greatness, which has caused RCA to achieve the eminent position it occupies.

No one will grudge David Sarnoff the honor of having directed RCA's affairs since its founding in a manner that has earned the world's respect. For, of all great industrialists now living, Sarnoff is incontestably the most generally popular and best known in America. And no American corporation has given its leader the spontaneous and unquestioning loyalty and devotion which the stockholders, Board of Directors, and employees of RCA have showered on Sarnoff. He has not only endeared himself to his people at RCA, but has lived to see himself hailed as the greatest Industrial Statesman of modern times. Those who would lose faith in the future of man or the future of this country would do well to ponder the story of David Sarnoff and his dreams of the days to come.

Sarnoff has almost become a legend in his own time. He has never for long been out of the public eye or the newspapers or the magazines or television. There is no end to the many awards, tributes, citations, gold medals, trophies, plaques, decorations, and testimonial scrolls conferred upon him, and they tell the story of a grateful nation. Although he did not have the opportunity to go to college for a formal education, numerous American colleges and universities have bestowed upon him their honorary degrees. He has participated in no activity of life that he has not adorned. He has gloried in triumphs such as few men have achieved.

Sarnoff takes an active interest in education, history, economics, art, music, military science and philanthrophy, and his accomplishments in these fields have won him the admiration of the world. While he is as comfortably off as any man can be with his RCA salary, he is not the millionaire he could have become, many times over, during his long career. For all the poverty of his youth, the mere acquisition of money has never been for him an obsessive goal.

The magic of the times in which we live is the product of many dreams and the fruit of the toil of many men who believed in those dreams. None has earned more credit for the acceptance of miracles as

*Herbert Hoover, President of the United States in 1929, addressing the American people on radio through the facilities of the National Broadcasting Company.*

David Sarnoff is a blessing to his generation and a glory to his country. An illustrious scientist, an eminent industrialist, a courageous mind, a fighter for human rights, he has shown himself to be a great American and one of the greatest men of our time.

HERBERT HOOVER
*Former President of the United States*

*David Sarnoff with Herbert Hoover, both eminent recipients of the Wisdom Award of Honor. When Hoover appeared on the NBC-Television Wisdom Series, he devoted an hour's conversation to his career and his views on public affairs. He spoke of his childhood and education, his work as a day laborer and engineer, his world-wide activities in social welfare, his experience as a leader in public affairs, and as the thirty-first president of the United States. He also commented on how he directed the work of the Hoover Commission during the Truman and Eisenhower administrations.*

commonplace than Sarnoff. Millions of Americans earn their livelihoods in the arts, sciences, and industries that make up radio, television, communications and electronics. Hundreds of millions the world over enjoy the benefits of these services because Sarnoff conceived of broadcasting as a service to mankind. Thus, no coined title would be adequate to cover the scope of his interests, activities and accomplishments. Bordering on the fabulous, his contributions to the twentieth century wonders of radio, television and electronics have put our country and the world immeasurably in his debt.

More than any other man, Sarnoff has a full appreciation of the scientific revolution which is transforming the world. The content of science changes every day. The spirit of inquiry and the search for truth gives science its enduring value. But Sarnoff attaches equal importance to the human values, and to art, literature, music, and such other things. A man of great social conscience with a passionate sense of social justice and social responsibility, he has never allowed moral values to be discarded. He has served his country with the highest distinction. In moments of peril he was undaunted. In his magnetic speeches he crystallized the resolution of the whole nation. And his prophesies have been ultimately fulfilled.

Sarnoff is many things to many people. To those who know him, his outstanding characteristics are his fearlessness, honesty, patriotism, and sense of destiny. He has an unassailable integrity of mind, which constitutes both honesty and moral courage, since it requires moral courage to be honest. And he has the tenacity to tell others when he differs from them and the generosity to tell them when he agrees with them. In a unique way, his career exemplifies the genius of America. Lacking material resources, but richly endowed with imagination, vision, and a zeal to achieve, he recognized the potential of the electron. His phenomenal mind helped put a new branch of physical science to work for the human race. His role as a prophet in predicting the achievements of radio and television gives us confidence that the still greater miracles he envisions in the years ahead will become realities for future generations.

It is a significant fact that at a time when most industrial giants of America have been eclipsed, Sarnoff remains the giant of one of the biggest corporations in the world, having survived many periods of testing, and maintaining his position unimpaired for more than sixty years. What other man concentrates in his person such varied and brilliant qualities? By his cosmopolitan outlook, he has become a world statesman whose views on international affairs are twenty years ahead of most other American leaders. By his courageous accomplishments, he stands out today as the most fascinating figure in American business and industry—esteemed, respected and admired by his country. Yet, he carries his greatness very lightly.

How does one dissect and evaluate and trace the progress of a many-splendored life—a life that has won world renown and influenced human affairs in our modern age? Thus, to appraise David Sarnoff's abilities and to assess accurately the value of his intellect and achievements is a task which none of his contemporaries can set about hopefully. His guiding genius in communications and electronics remains untarnished by age and undimmed by the immense strain which he has personally undergone for many years in the huge tasks which he has undertaken for RCA. And so, when a great man like David Sarnoff reaches the age of seventy-

seven, with a long life of brilliant achievement behind him, it is only fitting that the whole world should take notice of the event and pause for a moment to recall what the work, and what the existence of such a man means to it.

In any assessment of Sarnoff, his birth and temperament must play an important part. Also, his power of thinking and the self-discipline to which he has always subjected himself. This explains his enviable health and vitality, and why he is so very active and energetic. But the extent to which heredity and environment mold a man's character and personality is not always easy to assess. Despite his immigrant boy background, Sarnoff found no difficulty in adapting himself to the new life in America. In fact, his enthusiasm was great and revealed the inner urge for freedom that stimulated him and which was to become later the motive force of his whole career. He became the head of a giant industry, but never lost his sense of humaneness and fairness. He developed the qualities of a hard-hitting business leader. But also the humility of one who is an onlooker as the miracles of electronics unfold. He was always fiercely devoted to the advancement of communications, and yet today retains the enthusiasm of one who marvels at the golden age of science. He was more than a dreamer. He had a way of putting his dreams to work to produce new inventions or startling discoveries in electronics. He is still putting his dreams to work.

As one sees Sarnoff today, he scarcely looks his age. Hard work and unavoidable anxieties attendant in the life of a great industrialist do not seem to have made many inroads upon him. Fortune has favored him with a strong body, and his intelligent mind has grasped every opportunity that has come his way for acquiring knowledge, even though his formal education ended with the public schools in New York. And these factors have endowed him with a rich personality and individualism which few men hope to attain. He has been honored by scientific, industrial, military, civic and cultural groups, as well as the United States Senate, but he is not given to reminiscing, although, in its various aspects his life has indeed been a full and exciting one. When he does look back, it is to trace his progress through the years and most of this, he notes, has been a succession of challenges, fighting the resistance of human nature to change. He has no interest in yesterday, but looks for excitement in every tomorrow. And he has had his full share of it. Although he is the man who put radio and television in the home, he remembers the resistance of cable companies to the wireless, of phonograph makers to his "radio music box," and radio to television. They were all challenges to what he calls practical rather than dreamy imagination.

To fully appreciate color television's progress you have to know something of history, something of human nature, something of the way pioneering proceeds. "Color television," says General Sarnoff, "is merely following the historic pattern of product innovation. Over the years, hundreds of new products have encountered obstacles, both natural and man-made. But the worthwhile products manage to surmount these obstacles in good time. When radio broadcasting came along, the phonograph companies, fearful that it was a threat to their business, said: 'It'll never succeed. People want music when they want it.' Not only has broadcasting succeeded, but more phonograph records by the millions are being sold today than were sold before broadcasting was established. When talking pictures arrived, the silent movie industry said: 'Once the novelty wears

off, the talkies will disappear.' No one needs to be reminded of what happened to silent pictures. Similarly, when black-and-white television emerged, many people in the talking movie industry described it as 'that little peephole.' Today motion picture companies are producing most of their films for television, and frequently making more money from sales to television than from sales to theatres."

The point of his thesis is that science advances while human nature tends to remain the same, to the bedevilment of pioneers. "The world," Sarnoff explains, "is made up of pioneers and followers. The followers are the first to resist, and criticize innovation, just as they've resisted and criticized color television. They may have retarded color's progress, but they couldn't stop color from rolling. Couldn't possibly. Color television is here to stay, if only for the reason that it approximates reality. Let's face it, wouldn't it be a drab world if we were to see in black and white!"

Indeed, Sarnoff's is a life story in which great dreams have been brought to fulfillment. True, the vast ability and great intellectual qualities of Sarnoff were not discovered at an early age. But that is equally true of another world figure of modern times—Winston Churchill. What is more, Sarnoff's entire life is a brilliant and portentous realization of the American dream, holding out to humanity its enduring and limitless hope. Like the remarkable Mary Antin, the author and teacher, who, even as he did, came young to our land from Russia, he can now properly reflect upon his great achievements in and for his American home—and say: "I am the youngest of America's children, and into my hands is given all her priceless heritage, to the last white star espied through the telescope, to the last great thought of the philosopher. Mine is the whole majestic past, and mine is the shining future."

The circumstances of David Sarnoff's rise from poverty to his present prominence in American life are dramatic enough for the most exciting success story. The eldest of five children, he was born February 27, 1891, in Uzlian, a small bleak village of two hundred people, mostly Jews, in the Russian province of Minsk. His father was a desperately poor itinerant trader who went among the *moujiks* bartering shoes, clothing, produce and, occasionally, livestock. His mother was the descendant of a long line of rabbis.

When David was five, the elder Sarnoff set out alone for America, there to try to earn enough money to bring the rest of his family on later. Not long after he left for New York, David was consigned temporarily to the care of his granduncle, a rabbi who ministered to a parish of twelve families in the tiny settlement of Korme, one thousand miles away. There, in this forlorn outpost, David, the only child in the village, stayed for four and a half years. He never had a playmate in the settlement. From the time he mastered the Hebrew alphabet, most of his waking hours were taken up with Talmudic studies which began at seven in the morning and lasted, with intermissions for meals, until eight at night.

This strange, lonely period of his life ended when David was nine and a half. His father finally had earned enough money in America to bring his family over to join him. David rejoined his mother and two brothers and the family entrained for Libau, Latvia, where they embarked on the first boat David had ever seen. Their baggage included a big straw hamper of food especially prepared according to strict orthodox rules by David's mother—matzoth, cakes, pickled meats and so on. David's mother had made clear to him that the family would under no

*David Sarnoff (left), age five, with his mother, in Uzlian, Russia. Young David (below), in 1907, age sixteen, when he was an office boy for the Marconi Wireless Telegraph Company of America.*

*General David Sarnoff (left page) tapping out a message in 1961 on the National Press Club telegraph key in Washington. The young Sarnoff at 17 (below), who had taught himself the Morse Code and learned as much as possible in Marconi's experimental shops in New York, was given the job in 1908 as wireless operator for the station at Siasconset on Nantucket Island, Mass. During the many months at the lonely outpost, he gained further knowledge about wireless from the books in the station's technical library.*

circumstances touch the regular steerage food. At Liverpool, boarding another boat that was to take them to Montreal, he saw to his horror that the hamper had been lowered into the hold. He recalls that he suddenly had visions of the family starving for the whole voyage and that he took a great leap to the bottom of the hold. Almost miraculously, he landed on a big, soft bundle at the bottom, grabbed his hamper and, holding on to it for dear life, was eventually hauled up by a rope tied around his middle. "You'll get along all right in America," a sailor who spoke Russian told him when he had reached the deck again.

In New York the Sarnoffs moved into a small tenement flat in the East Side ghetto. A couple of days after his arrival David found a part-time job as a butcher's delivery boy for $1.50 a week. A few weeks later he started up a route for delivering the Jewish *Morning Journal*. Then his father, who had been taking on jobs as a house-painter, became too ill to work, and at ten David, who could speak no English, had to become the family's chief support at the same time that he was entering school. Somehow he managed it—rising at four, delivering and selling papers until school time, working at odd jobs in the late afternoon and evening, and winding up with his homework. It was a terrible burden for a young boy, but Sarnoff bore it with the same resolution that has always characterized him.

Borrowing some money from neighbors, David bought a newsstand at 46th Street and Tenth Avenue, in the Hell's Kitchen area, and expanded his newspaper-selling activities. When someone discovered that he had a good soprano voice, he began singing in a synagogue for $1.50 a week, and as time went by supplemented that extra income by singing at weddings. When, at fifteen, just before he was to perform during the High Holidays—and earn what to him was a good deal of extra money—his voice broke, he suffered a financial setback that to him was almost catastrophic. Not long afterward his father died. Sarnoff set about looking for full-time employment. He found it, in the spring of 1906, in the form of a $5-a-week job as a messenger for the little Postal Telegraph and Commercial Cable Company office. By continuing to get up at four he also kept up his morning newspaper routes.

No sooner had he gone to work as a messenger than David decided on advancing himself to the position of telegraph operator. With his first week's paycheck he bought a dummy telegraph key for two dollars and a book of instructions and codes. Each night, after finishing with his two jobs, he practiced on the key. Within six months David felt himself proficient enough with Morse code to apply for a telegraph operator's job at the Manhattan office of the Marconi Wireless Telegraph Company of America. The manager who interviewed him, George S. De Sousa, remembers looking the applicant over with some amusement. "He asked if I could use a man. I said we could use a boy—an office boy. He took the job," Mr. De Sousa recalls.

Compared to such Leviathans in the field of communications as the American Telephone & Telegraph Company, the Marconi Wireless Telegraph Company of America, however impressive-sounding its name, was a pretty small outfit specializing in marine communications. With its four land stations—at Sea Gate, Coney Island, at Sagaponack, Long Island, at Siasconset, Nantucket Island, and South Wellfleet, Massachusetts—it had only four ships to communicate with, and was losing money at a fair rate. To Sarnoff such matters were academic. Wireless

telegraphy was an exciting new business and he decided that his future lay in it. He began to read technical literature and to spend many of his spare hours and week ends doing odd jobs in the little laboratory American Marconi maintained. And when Marconi himself came to New York, Sarnoff was delighted at the opportunity of running occasional errands for him.

Meanwhile, he so persevered with his telegraph key that within six months he managed to get himself assigned as an assistant wireless operator at the Marconi coastal station at Siasconset, on Nantucket Island, at sixty dollars a month. He stayed there one year and became a full-fledged operator. After another year or so as operator-manager at the Sea Gate station at Coney Island, he put in a couple of seagoing stints as an operator first aboard the "S.S. Beothic," a sealer bound for the arctic ice fields, and then aboard the "S.S. Harvard," plying between New York and Boston.

Back on land again, Sarnoff soon took on an assignment momentous both for him and for the future of wireless. He was made manager of an experimental wireless station installed by John Wanamaker on the roof of his New York department store. On the night of April 14, 1912, as Sarnoff was sitting at his instruments in the Wanamaker station, he picked up the shocking message: " 'S.S. Titanic' ran into iceberg. Sinking fast." Young Sarnoff immediately notified the proper authorities and the press. For the next seventy-two hours, with only very short breaks, he sat at his instruments, continuously straining to make out the dots and dashes coming in from the "Carpathia" and from other ships which were picking up survivors. To accurately receive messages for such a long period, in those days of weak signals, primitive circuits and howling atmospheric interference, required remarkable skill and endurance. But Sarnoff stuck to it until he had copied down the last name from the list of 706 "Titanic" survivors (1,517 other people had gone down with the ship). Then he had a Turkish bath and a twelve-hour sleep.

The heavy publicizing of the crucial part that wireless had played in the "Titanic" rescue operations aroused the press, public and Congress to the importance of this new means of communications. A law was enacted requiring the placement of wireless equipment and operators on all ocean-going vessels carrying more than fifty passengers.

The newly recognized importance of radio, as people now began to call the system of radiating wireless signals from a transmitting tower, soon transformed American Marconi. Before long, it acquired two other companies and was operating sixty-four stations. Sarnoff felt the effects of the company's expansion. American Marconi, enlarging its training program, assigned him as instructor of operator trainees. It also appointed him inspector of Marconi equipment installed on passenger ships under the new radio laws.

From that point on Sarnoff began swiftly to rise in his company, which now dominated the United States wireless industry. As the importance of radio communications grew, Sarnoff's advances were rapid. He became successively Chief Inspector, Assistant Chief Engineer, Assistant Traffic Manager and, in 1917, Commercial Manager of the Marconi Company. In 1919, when the Radio Corporation of America was formed, it acquired the American Marconi Company and appointed him Commercial Manager. During the following eleven years, Sarnoff advanced from Commercial Manager to General Manager, then Vice-President,

Executive Vice-President and, in 1930 at the age of 39, to President of RCA. He was elected to serve as Chairman of the Board as well as President on July 11, 1947, and on January 1, 1949, he resigned as President, continuing as Chairman of the Board and Chief Executive Officer of RCA. In September, 1965, he proposed to the Board of Directors a realignment of RCA management. Effective on January 1, 1966, Dr. Elmer W. Engstrom became Chief Executive Officer. Robert W. Sarnoff succeeded him as President of RCA. In 1968 he became Chief Executive Officer. While relinquishing the duties of Chief Executive in order to lighten his load of responsibilities, David Sarnoff continues to serve as active Chairman of the Board of RCA.

As Commercial Manager of the Marconi Company, Sarnoff held an important job with an important company—a company that was proving itself too important for its own good. Despite the native-sounding title of the Marconi Wireless Telegraph Company of America, actual control of the organization was firmly centered in London, the communications center of the world. This fact was so irksome to the United States administration at a time of world crisis that when war came the government unhesitatingly took over control of most of American Marconi's facilities for the duration.

Even apart from difficulties caused by the dominant position of the Marconi interests, the American wireless industry had been having its troubles. Westinghouse, General Electric, American Telephone & Telegraph, United Fruit—all these big companies had basic radio patents, but none had enough to make complete transmitting or receiving systems without infringing on the patents of others. The industry was in an uproar of extravagant claims, counterclaims and savage litigation. (In 1912 Lee De Forest himself was put on trial on a charge of fraudulently selling stock for his wireless system "chiefly directed by a strange device like an incandescent lamp, which he called an Audion, and which device was proved to be worthless." The man responsible for one of the most universally applicable inventions since the wheel barely escaped jail, and in addition was given a lecture on the advisability of "getting a common garden variety job and sticking to it.")

Government control put the industry on a relatively even keel during World War I, but with the return of peace the wireless business threatened once more to fall into chaos. One of the men in the United States administration most interested in preventing this was Franklin D. Roosevelt, Assistant Secretary of the Navy. The Navy had a big stake in radio, and it made no secret of the fact that it wanted peacetime government control of coastal and international radio. This, however, Congress would not allow, and some naval officers then plumped for the creation of a private American monopoly of radio communications to and from the United States. In 1919, when Marconi interests began negotiating with the General Electric Company for exclusive rights to the Alexanderson alternator, then the best long-range radio transmitter in existence, Navy officials became alarmed at this renewed foreign threat to the independence of American communications. With Roosevelt's consent, Navy emissaries tried to head off the sale and to persuade Owen D. Young, Vice-President of General Electric, that the time had come for the creation of a super-company.

The result was the formation in 1919, under the chairmanship of Young and the majority ownership of General Electric (within the next

two years Westinghouse and American Telephone & Telegraph also acquired leading interests in the company), of the Radio Corporation of America, which promptly bought out American Marconi. Among American Marconi's assets to be transferred to RCA was Sarnoff, who now became RCA's commercial manager. One of his first acts at RCA was to revive a pet radio project of his that he had pressed upon his superiors at American Marconi in 1915. The proposal was for the development and production of what he called a "Radio Music Box." "I have in mind," he had written, "a plan of development which would make radio a 'household utility' in the same sense as the piano or phonograph. The idea is to bring music into the house by wireless. The problem of transmitting music has already been solved in principle . . . the 'Radio Music Box' can be supplied with amplifying tubes and a loud-speaker telephone, all of which can be placed on a table in the parlor or living room, the switch set accordingly and the transmitted music received."

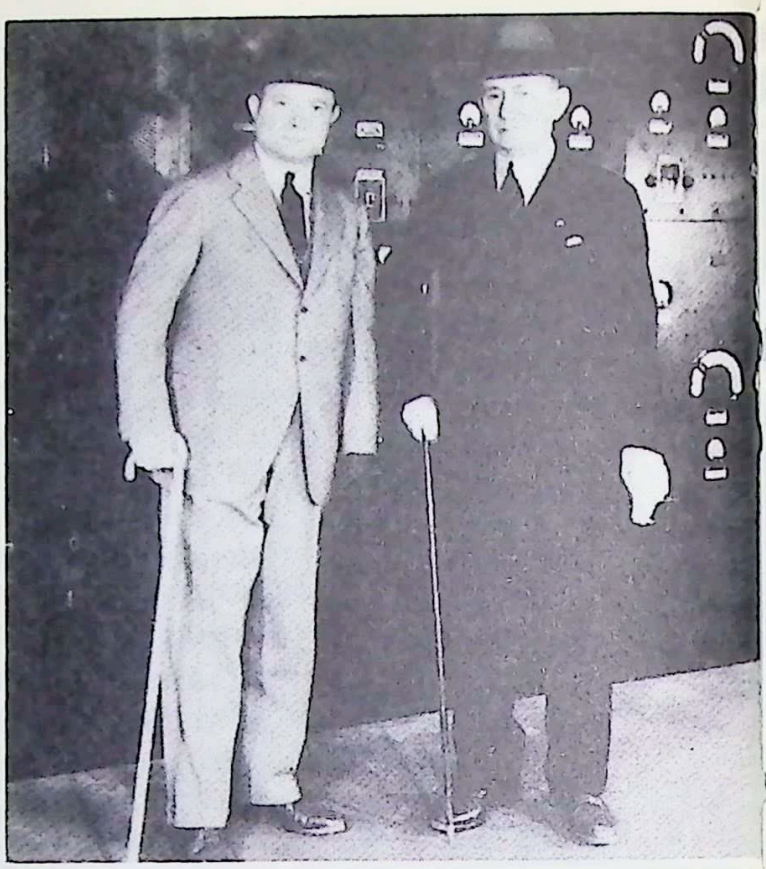
He went on to expound on some of the possible uses of the "Radio Music Box": lectures could be received right in the home, events of national importance could be simultaneously announced and received, and even baseball scores could be transmitted from a playing field. The costs of producing and transmitting such programs, he proposed, could easily be borne by a portion of the profits accruing from the sale of "Radio Music Boxes." Sarnoff's 1915 memo, which was to become perhaps the best-known single document in the history of radio, had gone formally unanswered by his chiefs at American Marconi. According to Sarnoff "they considered it a harebrained scheme." But, in 1920, when he resubmitted the idea to RCA, the Board of Directors allowed him $2,000 to develop a radio broadcasting receiver.

A few months later Sarnoff's superiors approved the placement of RCA's first production order with General Electric for "Radio Music Boxes." Dr. Frank Conrad, an engineer with Westinghouse, seriously began broadcasting in the modern sense when he began operation of Station KDKA, in East Pittsburgh. At the same time Westinghouse began selling simple crystal sets with which people in the Pittsburgh area could listen to KDKA's programs. When, in November, 1920, Westinghouse took the sensational step of broadcasting the Harding-Cox presidential election returns, radio's future as a household utility —and as a going industry—began to look promising indeed.

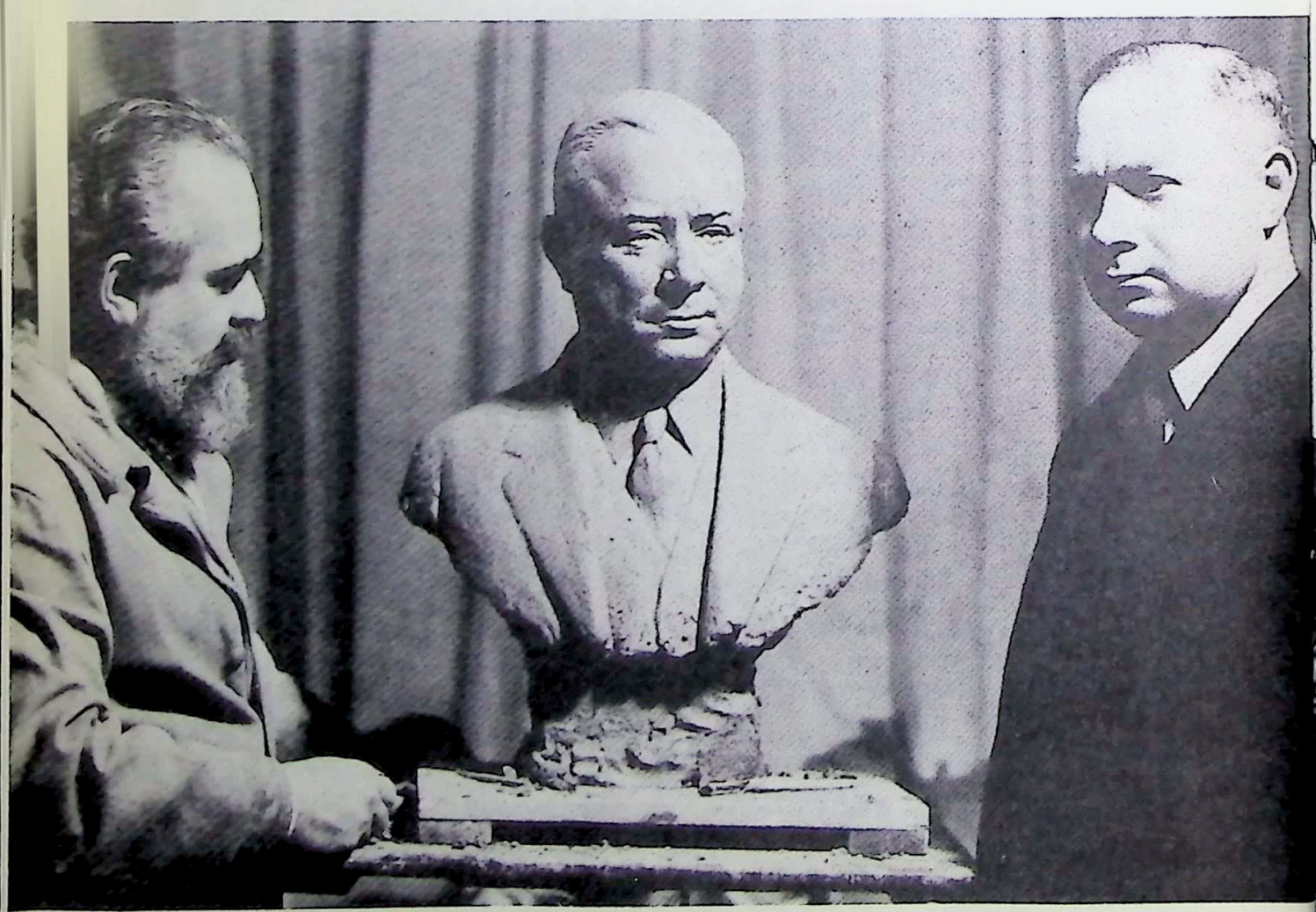
By that time RCA was selling crystal sets, too. Its first battery-and-tube operated sets, called "Radiolas," began to be produced by General Electric in 1921. On July 2, 1921, Sarnoff put RCA's first program on the air when, having borrowed a portable Navy transmitter, he arranged a remote broadcast from the ringside of the Dempsey-Carpentier world championship fight at Jersey City. Within a year, radio became a national craze. Stations sprang up everywhere. Every newspaper with a quick eye for circulation carried do-it-yourself supplements for amateur radio set builders. Listeners the country over were fiddling away at their dials and exclaiming at radio's wonders.

Philosophical reflections on the probable future social effects of radio were voiced everywhere. Owen D. Young, displaying, in 1922, the kind of hopes that many of today's communications prophets now hold out for television, told the press that "radio . . . will be the greatest potential educator and spreader of culture ever dreamed of . . . the most democratic, the most easily assimilated, the most universal and cheapest

*When Gen. James G. Harbord (left) retired from RCA presidency in 1930 to become chairman, the 39-year-old David Sarnoff was elected president.*



*Sarnoff, who began as Marconi's office boy, became his close friend. They are shown inspecting the RCA Communications Transmitting Center in 1933.*



*Noted sculptor Jo Davidson created a bust of Sarnoff in 1937.*

*General Sarnoff, Edward J. Nally, First President of RCA, and Owen D. Young, First Chairman of the Board of RCA, at the 25th Anniversary Dinner of the Corporation, December 1, 1944.*

*In 1952 David Sarnoff was designated "Father of the Year," a well-deserved title for a very busy man who found time to share activities with his three sons, Robert (left), now President of RCA, Edward (right), a New York businessman, and Tom (seated), Vice-President of NBC on the West Coast.*

*General Sarnoff with his wife at their residence. They were married in 1917 and live in New York City. In 1965, Mundelein College conferred upon Mrs. Sarnoff an honorary degree of Doctor of Humane Letters.*

form of publication man has imagined."

Sarnoff had optimistically predicted, first in 1915 and again in 1920, that the sales of "Radio Music Boxes" could gross seventy-five million in the first three years of production. As it happened, the radio boom knocked even these audacious estimates awry. Between 1920 and 1922 alone the American public spent possibly as much as one hundred millions dollars for radio sets, tubes, headphones and batteries. By 1924, when a huge audience, many of its members listening in on the new superheterodyne sets with the popular gooseneck speakers, heard William Jennings Bryan, speaking from the Democratic National Convention at Madison Square Garden, describe broadcasting as "a gift of Providence," the number of home receivers in the country had reached the staggering figure of three million.

As rapidly as radio advanced, so did Sarnoff. Predictions and proposals continued to pour out from him. In 1920 and again in 1922 he expressed "a hunch" about the feasibility of using short waves for long-distance communication—a method now considered basic to modern transoceanic radio. Also in 1922, in answer to those who expressed anxiety that radio would do away with the phonograph, he declared that radio would be its making if the two home instruments could only be combined economically in one cabinet. Thus he anticipated the development of the modern radio-phonograph industry. In 1923, he predicted that "everything which moves or floats will be equipped with a radio instrument—the airplane, the railroad, steamship, motorboat, automobile and other vehicles."

When broadcasting reached the stage of general public interest, General Sarnoff proposed the formation of the National Broadcasting Company, which was established in 1926. Inspired by the idea of television, General Sarnoff was one of the first to foresee its great possibilities. As early as April 5, 1923, in a report to the RCA Board of Directors, he said: "I believe that television, which is the technical name for seeing as well as hearing by radio, will come to pass in due course. . . . It may be that every broadcast receiver for home use in the future will also be equipped with a television adjunct by which the instrument will make it possible for those at home to see as well as hear what is going on at the broadcast station."

From that date forward, General Sarnoff continued to stimulate thought, to pioneer in the research and development of television and to promote its introduction to the public. Standing before a microphone at the New York World's Fair, which opened on April 30, 1939, with a telecast featuring President Roosevelt as the first Chief Executive to be seen as well as heard on the air, General Sarnoff announced the birth of a new industry—television. "Now we add sight to sound," he said. "It is with a feeling of humbleness that I come to this moment of announcing the birth in this country of a new art so important in its implications that it is bound to affect all society. It is an art which shines like a torch in the troubled world. It is a creative force which we must learn to utilize for the benefit of all mankind. This miracle of engineering skill which one day will bring the world to the home, also brings a new American industry to serve man's material welfare. Television will become an important factor in American economic life."

Through General Sarnoff's faith, foresight and leadership in all phases of television, it developed into the greatest system of mass com-

munications the world has ever known. Television became a major industry and a new art and service of widespread proportions. Under his direction RCA spent more than fifty million dollars on research and development of black-and-white television before there was any return on the investment. And, by the end of 1965, RCA had spent many more millions on the research and development of compatible, all-electronic color television.

In 1929, General Sarnoff conducted negotiations with phonograph manufacturers for combination radio-phonograph sets. His negotiations resulted, that year, in acquisition by the RCA of the Victor Talking Machine Company. During 1930, General Sarnoff put into effect the program of unification by which RCA acquired radio manufacturing rights and facilities owned by the General Electric Company and the Westinghouse Electric and Manufacturing Company. Negotiations carried on by Sarnoff resulted in new arrangements and agreements with those companies. As a result, RCA emerged as a complete, self-contained unit covering the entire field of radio development. Under this readjustment RCA acquired patent rights for the manufacture and sale of radio devices in the broad fields of radio and electronics. It enabled the company to discharge the larger part of its current indebtedness to its former associated companies, and stabilized its position and that of its various subsidiary companies. This program has been widely recognized as an outstanding industrial achievement.

General Sarnoff was an early believer in the importance of radio broadcasting as a cultural and educational medium. In 1928, he established the weekly "Music Appreciation Hour" under Dr. Walter Damrosch, which became a regular part of the curriculum in thousands of schools throughout the United States. Endowed with a keen sense of appreciation of music, Sarnoff's ambition to put Grand Opera on the air for the entire country was realized for the first time in 1931 when he arranged for broadcasts direct from the stage of the Metropolitan Opera House in New York. Since that time the Metropolitan Opera has been on the air coast-to-coast each season.

In 1937, General Sarnoff persuaded the world-famous Maestro Arturo Toscanini to return from Italy to America to conduct a series of ten symphonic programs over the NBC, and sponsored the creation of a new symphony orchestra to play under Toscanini and other eminent conductors. The NBC Symphony Orchestra was the first full-size symphony orchestra ever created exclusively for radio. This orchestra, acclaimed by music critics as equal to the world's best and "in a class by itself," continued under the direction of Maestro Toscanini until April 4, 1954, when he retired at the age of eighty-seven. General Sarnoff, on December 4, 1955, announced the formation of the NBC Opera Company which would tour America presenting operas in English. It would augment the NBC Television Opera Theatre, and would give performances in major cities throughout the United States and eastern Canada.

President Roosevelt wrote on the occasion of General Sarnoff's thirtieth anniversary in radio, on September 30, 1936: "It has come to my attention that presently you will complete thirty years of service in the field of radio. In an early day you visioned the possibilities of this new art both in the field of commerce and as a service to the general public. You have served with distinction in its progress not only in this

country but throughout the world. The even greater developments in the years to come remain as a challenge to your energy and your intelligence. I am most happy to join with your many friends and associates in sending my greetings and my sincere congratulations."

Lieutenant General James G. Harbord, who preceded General Sarnoff as President of RCA and who in 1930 became Chairman of the Board of RCA, offered this tribute in an address at a dinner commemorating General Sarnoff's thirty years in radio: "Few runners in life's handicap have ever entered the race with more burdens and fewer advantages than David Sarnoff. He had, however, that background of poverty without which few can hope to succeed. And with it he had indomitable perseverance, honesty, untiring industry, boundless ambition, and great business ability. He came from honest stock and a home with religious parents. With such mental and moral endowment, he was to ally himself with a new art, and thereby profoundly to influence the life of his generation. A disciple and a friend of Marconi, he became the leader in the development and application to modern life of the art of which the older man may not improperly be called the father. The two men have been the complement each of the other in his life's work."

On the same occasion, the inventor of wireless, Guglielmo Marconi sent this message to the Radio Corporation of America: "May I join the RCA Family in celebrating Mr. David Sarnoff's thirty years service in radio and congratulate him on his success in the development of American radio industry and world-wide radio-communications. I am particularly gratified in sincerely greeting Mr. David Sarnoff tonight s his first connection with radio was in association with me. I rejoice ver his amazing career and from the very bottom of my heart, wish im many more years of well-earned happiness and prosperity and equally brilliant service in the interest of commerce, industry and in the advancement of science." In responding to the tributes, General Sarnoff said: "My experiences testify to the opportunities provided by America for initiative, self-expression and advancement."

General Sarnoff's interest in military and naval radio dates back to World War I, when he played a prominent part in helping to equip our fighting services with wireless. On December 7, 1941, the historic day on which the Japanese attacked Pearl Harbor, General Sarnoff, as President of RCA, sent this message to President Roosevelt: "All our facilities and personnel are ready and at your instant service. We await your commands."

All divisions of RCA—research laboratories, manufacturing plants, broadcasting and communication facilities—were assigned to aid the conduct of the war. Under General Sarnoff's leadership, the company's production of vital radio, sound and electronic equipment for the Armed Forces of the United States and of the United Nations increased one hundred per cent in 1943 over 1942, and continued at a record-breaking rate in 1944 and 1945.

Having been appointed Lieutenant Colonel, Signal Corps Reserve, United States Army, on December 11, 1924, Sarnoff was active in military communications and completed a course of studies at the War College, Washington, D.C., in 1927. He was promoted to the rank of Colonel on December 23, 1931, and again promoted to the rank of Brigadier General on December 6, 1944. During World War II, General Sarnoff was on active military duty for one year, during which time he

was on leave of absence from the Radio Corporation of America. For several months following the United States' declaration of war, he was in the office of the Chief Signal Officer in Washington, D.C., "to devote special attention to supervision of production expediting activities and those activities of Facilities & Materials Branch pertaining to plant expansion and allocation of materials." After completing the assignment, he resumed his post at the Radio Corporation of America where he concentrated on research, production and communication services to advance the nation's war efforts.

Called again to active military duty, he left on March 17, 1944, for overseas, where he received his appointment as Special Consultant on Communications at SHAEF. On October 11, 1944, he was awarded the Legion of Merit for his military services overseas, and the War Department recommended him for promotion to a general officer. He was nominated Brigadier General by President Roosevelt on November 21, 1944, and the rank was confirmed by the Senate two weeks later. President Truman, on February 27, 1947, nominated him Brigadier General, Officers' Reserve Corps, Army of the United States, and this nomination was unanimously confirmed by the United States Senate. On March 31, 1953, he was appointed by President Eisenhower, and confirmed by the United States Senate, to serve for an indefinite term as Brigadier General (Reserve), Army of the United States.

The Army's Legion of Merit citation read: "Colonel David Sarnoff, Signal Corps, United States Army, for exceptionally meritorious conduct in the performance of outstanding service while serving as Assistant to the Deputy Chief Signal Officer, Supreme Headquarters, Allied Expeditionary Force, from 23 August 1944 to 16 September 1944. Colonel Sarnoff was largely responsible for reopening communications in Paris thus enabling press communications to resume both to the United Kingdom and to the United States. His ingenuity and resourcefulness made it possible to restore cables which had been severed by the enemy, and allowed French radio experts who had not worked for many years during the occupation, to return to their former duties. Colonel Sarnoff's outstanding devotion to duty, courage, and great diplomacy in handling French citizens have aided materially in overcoming the great difficulties in attaining this objective. Entered military service from New York."

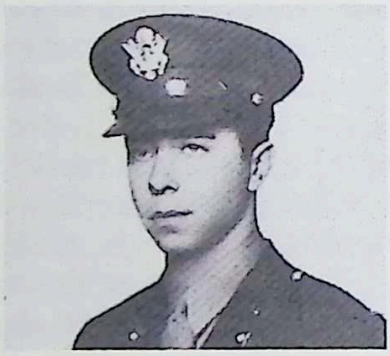
General Dwight D. Eisenhower, writing to General Sarnoff from Supreme Headquarters of the Allied Expeditionary Force, said: "Your contribution in anticipating and preparing proper communication facilities for the Press prior to D-Day and immediately thereafter was notable, and your initiative in reopening "Radio Paris" deserves commendation. You have, as Acting Chief, Communications Section, with the United States Group-Control Council, placed the benefit of your years of experience in the field of world-wide communications at its service, and this guidance will undoubtedly contribute to the Council's future success. I wish to express my sincere appreciation at this time for the services that you have rendered to your Country and to this Headquarters."

Major General H. C. Ingles, Chief Signal Officer of the United States Army, speaking at the 25th Anniversary Dinner of the Radio Corporation of America, in directing his remarks to the RCA Family, said: "You have attached your President, David Sarnoff, to the Signal Corps from time to time as occasion demanded. General Sarnoff's exceptionally meritorious conduct in the performance of outstanding services

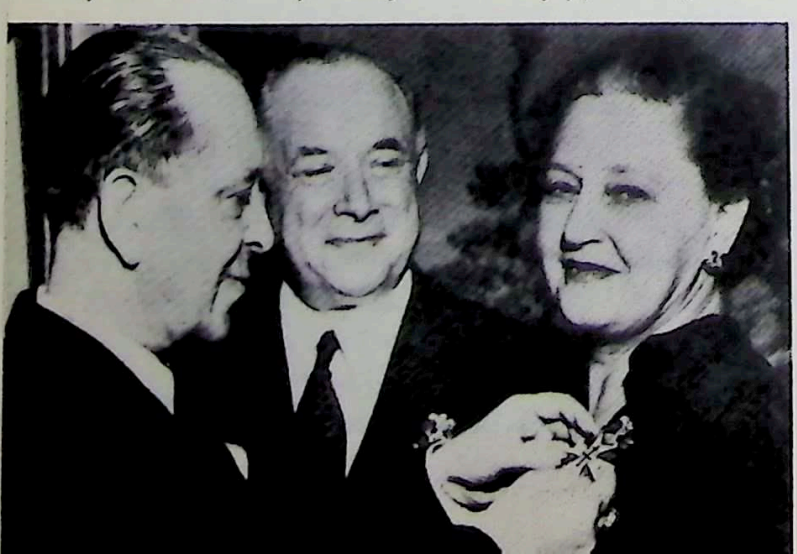
*World War II brought Sarnoff (left) —a Colonel in the U.S. Army's Signal Corps Reserve since 1924—into active military service. On leave of absence from RCA, he served overseas for 9 months as Special Consultant For Communications to General Eisenhower at SHAEF, where he set up D-Day communications systems and helped to reinstate Radio Paris after France was freed. His accomplishments won him the Legion of Merit.*

*In 1944 (right), Sarnoff's promotion from Colonel to Brigadier General, on recommendation of the War Department and his nomination by President Roosevelt, received U.S. Senate confirmation. He is shown here receiving the star of his rank from Gen. H. C. Ingles, Chief Signal Officer, U.S. Army.*

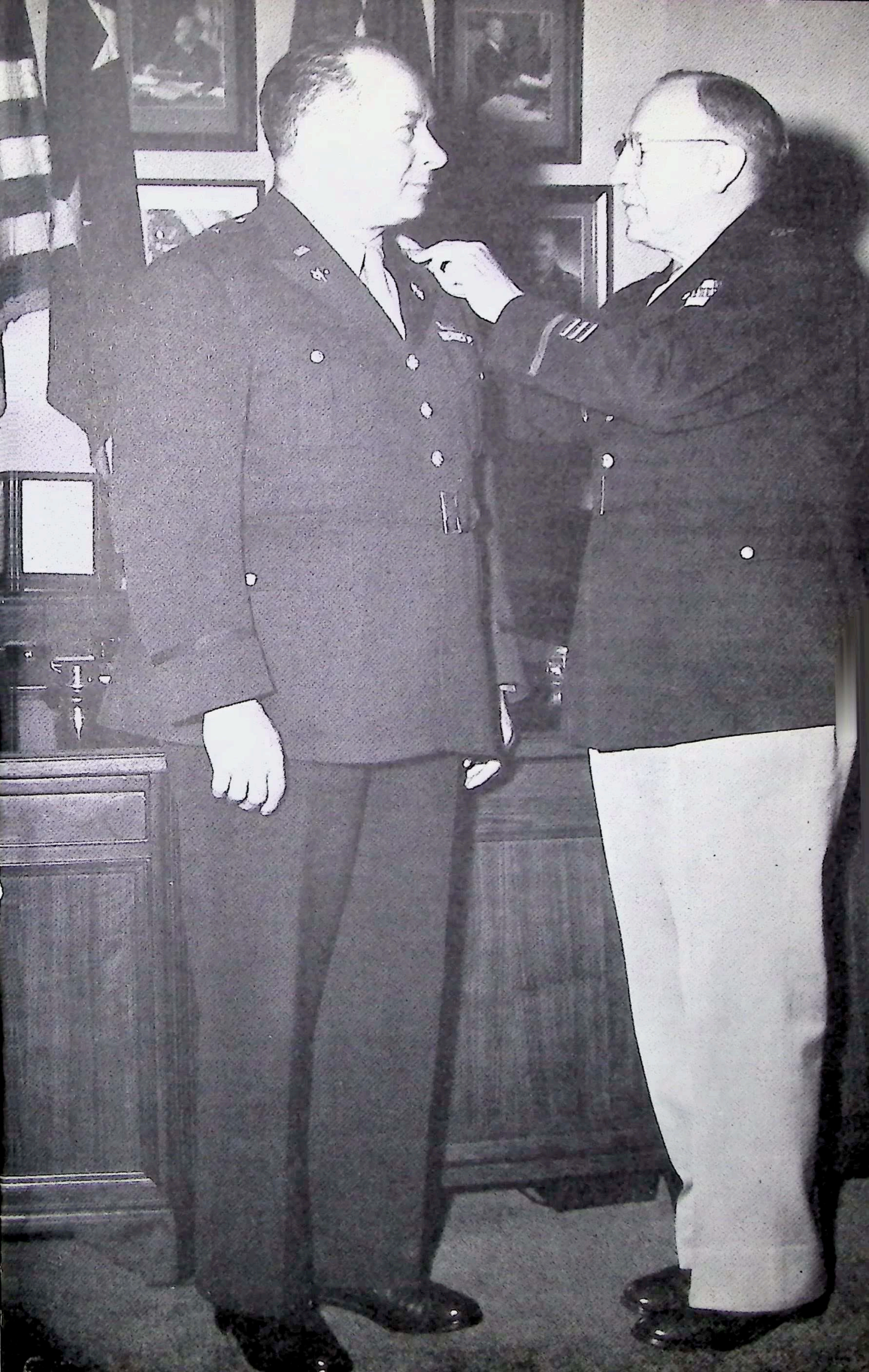
*During World War II, Mrs. David Sarnoff was Chairman of the Red Cross Nurses' Aide Unit of the N. Y. Infirmary.*



*World War II saw four Sarnoff men in uniform: Son Robert W. Sarnoff (right) was a Lieutenant in the U.S. Navy; son Edward Sarnoff (upper left), a Captain in the U.S. Army; son Thomas W. Sarnoff (lower left), a Sergeant in the U.S. Army.*



*The General and Mrs. Sarnoff were decorated by Roger Garreau, French representative to the United Nations: Mrs. Sarnoff for her work during World War II as Chairman of Nurses Aide Volunteer Section of the Red Cross—the General for services to France in radio communications during the occupation and liberation.*



has gained him the Legion of Merit Award, a decoration which he richly deserved. . . . I can assure you that General Sarnoff's work in Europe was only one instance of his service to the Signal Corps and to the Nation."

On February 8, 1946, President Harry S. Truman presented The Medal for Merit to General Sarnoff for services of "inestimable value to the war effort." The citation read: "David Sarnoff, for exceptionally meritorious conduct in the performance of outstanding services to the United States as President, Radio Corporation of America, from October 1942 to March 1944. Mr. Sarnoff placed the full resources of his company at the disposal of the Army whenever needed, regardless of the additional burden imposed upon his organization. He encouraged key personnel to enter the service, and at his direction RCA engineers and technicians rendered special assistance on numerous complex communications problems. He fostered electronic advances which were adapted to military needs with highly beneficial results. The wholehearted spirit of cooperation which Mr. Sarnoff inculcated in his subordinates was of inestimable value to the war effort."

On September 23, 1947, the French government decorated General Sarnoff with the Cross of Commander of the French Legion of Honor. In conferring this high honor, the Consul General for France in New York, said: "It is my privilege to tell you that the honor bestowed upon you is a token of our profound gratitude for your war services in the liberation of my country. My government will never forget the part you played at the side of General Eisenhower in the all important mission of re-establishing radio electric circuits between the United States and France, at a time when radio communications between the two continents were so vital to the successful conduct of the war. General Sarnoff, I am happy to see you wear this decoration, symbol of your valor and of your devotion to closer Franco-American relations."

On October 22, 1952, Robert A. Lovett, then Secretary of Defense, appointed General Sarnoff Chairman of the Citizens Advisory Commission on Manpower Utilization in the Armed Services. The function of this Commission was to review the subject of economy and efficiency in the use of men, money, and materiel by the Department of Defense. The Commission completed its assignment and filed its Report on February 17, 1953. Shortly thereafter General Sarnoff was named by the Secretary of Defense, Charles E. Wilson, to serve as a member of the Committee on Department of Defense Organization. The function of this Committee, which included eminent scientists and top-level military officers, was to study and recommend changes for improving the organization and procedures in the Department of Defense. This Committee completed its assignment and filed its Report on April 11, 1953. The two Reports, above referred to, are now public documents, having been officially published by the United States Senate.

President Eisenhower appointed General Sarnoff as Chairman of the National Security Training Commission on November 17, 1955. The purpose of the Commission is to safeguard the welfare of trainees while they are undergoing active military training under the Reserve Forces Act of 1955. The Commission evaluates the training program and advises the Defense Department on matters connected with training. The Commission reports periodically to the President and to the Congress of the United States.

General Sarnoff's vision and untiring interest in all phases of radio

communications led him into the field of invention. On December 7, 1948, the United States government awarded him Patent No. 2,455,443, for an invention he made covering a secret signaling system. On October 16, 1951, his second Patent, No. 2,571,386, was issued to General Sarnoff for his invention of an *Early Warning Relay System*. This system combines the principles of television, radar, microwave relay and the latest methods of detection and direction-finding. The system, which utilizes equipment developed and in use, is a method for surveillance of a string of areas off-shore, or remote from the borders of a country, for detection of planes, guided missiles, enemy vessels, or other targets in those areas. It provides for instantaneous communication of running target positions to a central intelligence station or command post within the country for interception purposes.

On the occasion of General Sarnoff's 45th Anniversary in radio, on September 27, 1951, the Princeton, New Jersey, laboratories of RCA were dedicated as the "David Sarnoff Research Center." At that time a bronze plaque was unveiled, commemorating the event. Among the congratulatory letters and telegrams received by General Sarnoff in connection with the anniversary ceremonies at Princeton, was the following message from President Truman: "Congratulations on your forty-five years of great achievements in the field of radio, television and electronics. Through your leadership in American industrial life and in science, you have contributed immensely to the growth of America and its pre-eminence in communication. It is most fitting therefore that RCA Laboratories at Princeton be named, the 'David Sarnoff Research Center,' and I extend to you and your staff of scientists my warm good wishes for continued progress."

General Sarnoff has received many honors and awards from scientific, industrial and cultural organizations. The Television Broadcasters Association, in recognition of his work in introducing and developing television in the United States, conferred on General Sarnoff the title "The Father of American Television," and in 1944 awarded him its highest citation of distinction, which read: "David Sarnoff knows conditions throughout the world with respect to electronics and with respect to television and his citation is for his initial vision of television as a social force and the steadfastness of his leadership in the face of natural and human obstacles in bringing television to its present state of perfection. The Committee on Awards of the Television Broadcasters Association wishes to call him 'The Father of American Television.' "

On November 2, 1949, General Sarnoff was awarded the Peter Cooper Medal for the Advancement of Science for his "contribution to the application of science to the new arts of communication, the radio and television; thus serving human welfare and thereby accomplishing Peter Cooper's principal desire—the 'application of science to the useful occupations of life.' "

The Honor Medal, first annual industry award of the Radio Television Manufacturers Association, was presented to General Sarnoff in June, 1952: "In recognition of his courage, vision, judgment, and outstanding contributions to the progress and development of the radio-television industry." On March 25, 1953, the Institute of Radio Engineers presented General Sarnoff the first Founders Award of the Institute, with the following citation: "For outstanding contributions to the radio engineering profession through wise and courageous leadership in the

planning and administration of technical developments which have greatly increased the impact of electronics on the public welfare."

The National Association of Radio and Television Broadcasters, on April 29, 1953, presented to General Sarnoff the First Annual Keynoter Award of the NARTB, which cited him as a pioneer in broadcasting: "Whose vision, industry, leadership and faith are essential components of the free American system of broadcasting . . . for his good citizenship in the quiet hours and in the hours of strife . . . for the steadfastness which has marked his achievements in modern times . . . and because he has shared his great dream of communications with the millions whom we serve."

On April 30, 1954, General Sarnoff was awarded the 1954 Gold Medal of the French Union of Inventors: "For exceptional services rendered to science and to the television technique. We therefore recognize that General David Sarnoff has rendered exceptional service to the Development of Technical and Social Progress." The Liaison Center of Professional Engineers and Inventors of France presented to General Sarnoff its 1954 Medal of Merit on November 14, 1954, for "your many accomplishments."

September 30, 1956, marked the 50th Anniversary of General Sarnoff's service to radio, television and electronics. It was on that date in 1906 that he entered the employ of the Marconi Wireless Telegraph Company of America as a messenger boy. A Golden Anniversary Dinner attended by more than a thousand friends and associates was held at the Waldorf-Astoria on the evening of September 30, 1956, and messages were received from many notables including President Dwight D. Eisenhower. Sir Winston Churchill sent "warm good wishes and my congratulations on the 50th Anniversary of your work in the field of wireless and television to which you have contributed so much." Governor Averell Harriman of New York wrote: "You are one of the great Americans of our day. Yours has been a fabulous career in which you can take great pride. Blessed with vision, a brilliant mind, and bold imagination, you have blazed a path for others to follow in so many fields—in radio, in television, in electronics, and in the field of nuclear energy. . . ." Dr. Lee DeForest said: "I join with your host of admiring friends in deep appreciation of the grand things you have achieved for radio communications and in the electronics industry during these fifty years. And further, as a profound civic philosopher the entire nation is deeply indebted to your extraordinary thinking and keen foresight. . . ."

Tributes and awards were presented to General Sarnoff by the Radio Pioneers, citing his leadership in pioneering, and from the National Appliance & Radio-TV Dealers Association, in recognition of his contributions to the radio-television business. Dr. Elmer W. Engstrom, Senior Executive Vice-President of RCA, recalled that General Sarnoff on his 45th Anniversary of service in radio, asked for three "presents" from the RCA scientists for his 50th Anniversary. Dr. Engstrom announced that the gifts, representing major advances in electronics, were ready for presentation and would be "unwrapped" for demonstration publicly on October 1st, at the David Sarnoff Research Center, Princeton, New Jersey. The "presents," which were shown on color slides at the dinner, included: A magnetic tape recorder for both color and black-and-white television for broadcast use; a home "hear-see" magnetic tape player which reproduces television programs through standard television

receivers; an electronic amplifier of light which amplifies by up to one thousand times the brightness of projected light; and an application of it in the form of an amplifying fluoroscope for industrial X-ray use; a room cooled or heated by electronic panels, operating in complete silence and with no moving parts; also a noiseless electronic refrigerator with no moving parts.

Congratulating the scientists, research men and engineers for their pioneering courage, perseverance and competence, General Sarnoff expressed his grateful thanks and accepted "the amazing gifts on behalf of our company." He said that in time they would find their way to the market place, serve the public, benefit industry and open immense fields for further exploration and development. "However impressive the events that have filled the last fifty years, or even the last century," said General Sarnoff, "I am convinced that they will be eclipsed by the events of the next twenty years. Let us consider twenty major developments likely to affect all of us within that time." With that preface, General Sarnoff proceeded to make twenty predictions for the twenty years ahead, including such fields as nuclear and solar energy, communications and transportation and electronic light.

His list of forecasts included the following statement regarding Communism: "Within the next twenty years Soviet Communism will collapse under the weight of its economic fallacies, its political follies, and the pressures of a restive, discontented population. These pressures will increase with the rise and spread of education amongst their own people. Practical ways and means will be found by the free world to pierce the Iron Curtain and bring home to the Russian people the facts and the truth. The Soviet empire will fall apart as one satellite after another attains its own liberation. The Communist hierarchy will destroy itself by internal struggles for power and will be displaced by a military dictatorship which in turn will give way to representative government."

In regard to science and religion, General Sarnoff said: "As a reaction against current cynicism and materialism, there will be an upsurge of spiritual vitality. The gradual elimination of physical hungers will deepen the more elemental hunger for faith and salvation, for age-old values beyond the material and temporal that gnaw at the heart of man. Science begets humility. Its every discovery reveals more clearly the divine design in nature, the remarkable harmony in all things, from the infinitesimal to the infinite, that surpasses mortal understanding. The physical processes and laws of the universe are logical, all-embracing and wholly dependable. They imply a Supreme Architect, and the beauty and symmetry of His handiwork inspire reverence."

Among activities outside the field of radio, General Sarnoff is known for his effective work with Owen D. Young on the final reparation settlements made in Paris during 1929, which resulted in the adoption of the "Young Plan," in which he played an important role. In an interview published in a national weekly, Mr. Young said of David Sarnoff: "He was our principal point of contact with the German delegation, and he did an extraordinary piece of work in negotiating for us with them. . . . One could easily see that each man in the group of American delegates and experts was effective and at one time did a job that saved that conference; each seemed to have a part in the crisis which prevented it from being wrecked, and that can be said of Sarnoff in particular, for there came a time when only one man could save the situation, and that

All my life I have cherished the highest esteem for David Sarnoff both as a great American industrialist and a superbly civilized champion of freedom for his own and all other countries. His greatness springs from his humanitarian outlook. Deep wisdom and charitable humanism are indeed the two main foundations upon which is based the elevation of men like General Sarnoff, who are not only loyal to their country's cause but also to those superior human goals common to all mankind. Such men have the breadth of vision that leadership demands. Such great men of wisdom bring about justice and freedom, peace and security in the world.

Eleanor Roosevelt

ELEANOR ROOSEVELT

*An eminent recipient of the Wisdom Award of Honor, Eleanor Roosevelt is shown reading the special edition of Wisdom Magazine on which she collaborated with the Editors of Wisdom. It was devoted to her wisdom and published in tribute to her distinguished achievements as a world humanitarian. In her appearance on the NBC-Television Wisdom Series, a filmed conversation in which she covered an amazing range of subjects, Mrs. Roosevelt discussed the political obligations of the citizen, the practical mechanics of politics, her opinion of her husband's greatest accomplishments and mistakes, the present-day challenge, and her hopes for the future.*

I congratulate David Sarnoff personally for his splendid leadership, and for achieving pre-eminence for the United States in the fields of communication, entertainment and education. In an early day he envisioned the possibilities of radio and television in the field of commerce and as a service to the general public. His organization throughout the years has created new wonders and brought into being new services for people everywhere. He has served with distinction in its progress not only in this country but throughout the world. I wish him and all members of the RCA family continued success in pioneering. I know that under his guidance and vision RCA will continue to contribute greatly to the economic and cultural values created by radio, television and electronics. The even greater developments in the years to come remain as a challenge to his energy and his intelligence.

Franklin D. Roosevelt

FRANKLIN D. ROOSEVELT
*Former President of the United States*

*Sarnoff was appointed by President Roosevelt, in 1941, as one of the original commissioners of the Fair Employment Practices Committee. He has served the United States government on many domestic fronts.*

arose toward the end with Sarnoff and the German delegation."

General Sarnoff's creative efforts in art and industry, as well as his leadership in the field of science, and world-wide communications—both commercial and military—have won for him high cultural and civic honors in America and abroad. Before World War II, the French government made him an Officer of the Legion of Honor, Poland conferred on him the Order of Polonia Restituta, Officers Grade, and Luxembourg honored him with the Order of the Oaken Crown for his accomplishments in the art and science of radio.

His participation in the vast expansion of radio communication throughout the world, and in the establishment of radio as a medium for popular education and entertainment, was recognized by the American Nobel Center which, in 1945, selected General Sarnoff as first recipient of its "One World Prize," for "contribution to international understanding through the radio."

On December 10, 1949, he was presented a citation by the United Nations "for his notable cooperation in the development of public understanding of the work of the United Nations and for his contribution in the field of Human Rights through the advocacy of concepts of Freedom to Listen and Freedom to Look as fundamental expressions of Freedom of Information."

On August 28, 1950, General Sarnoff was presented with a Gold Citizenship Medal and Certificate of Merit by the Veterans of Foreign Wars "in sincere tribute to the courage and determination which motivated his rise from the humble station of an immigrant boy to a position of unchallenged world leadership in the field of communication; and for his outstanding contribution to this nation's progress in both peace and war."

He received the First World Brotherhood Award of the Jewish Theological Seminary of America on March 18, 1951, "in recognition of his scientific contributions that have brought men everywhere closer in mind and spirit, and his devotion to the ideal of the Brotherhood of man under the Fatherhood of God."

General Sarnoff has engaged in various civic and cultural activities. He is a member of the Council of New York University; a director of the Chatham Square Music School, of which he is also Chairman of the Board; a trustee of the Pratt Institute, United Seaman's Service, Inc., the National Foundation for Infantile Paralysis, American Heritage Foundation, Education Alliance, Thomas A. Edison Foundation, and United States Council of International Chamber of Commerce.

The 1955 Gold Medal Achievement Award of the Williamsburg Settlement, sponsored by the Brooklyn Philanthropic League, United Order True Sisters, was presented to General Sarnoff on May 15, 1955. The inscription on the Medal read: "In recognition of his national reputation as a Philanthropist, Humanitarian and Industrial Leader, as one who has risen to the top from humble beginnings—a truly American story—an inspiration to the youth of our country." The 1955 Gold Medal of the Hundred Year Association of New York, which was presented to General Sarnoff on September 29, 1955, stated that his "accomplishments as a civic leader, patron of the arts, and head of the Radio Corporation of America make him the embodiment of the ideal of equal opportunity at work in a free society."

The James Forrestal Memorial Medal of the National Security Industrial Association was awarded to General Sarnoff on January

26, 1956, for being "a distinguished American whose leadership has promoted significant understanding and cooperation between industry and government in the interest of national security." On February 8, 1958, he received the Distinguished Service Citation of the Reserve Officers Association of the United States for "services to his country above and beyond the call of duty which have strengthened our National Defense and established a comforting climate of National Security."

General Sarnoff received a Fifty-Fifth Anniversary Testimonial Scroll on August 30, 1961, "in commemoration of his dedicated services and outstanding contributions to the advancement of communications and electronics in the United States of America." This scroll was presented by United States Senators.

On March 6, 1962, General Sarnoff received a plaque from the Air University of the United States Air Force for his "patriotic service . . . as a member of the Air University Board of Visitors for the period of 1960-62." The American Legion National Commander's Award was presented to him on March 1, 1965, "in recognition of nearly sixty years of creative service in the electronic communications industry which has served America's military and civilian needs so well in times of war and peace."

General Sarnoff received the AFCEA Distinguished Service Medal from the Armed Forces Communications and Electronics Association, at its Annual Convention in Washington, D. C., on May 26, 1965, in recognition of his "executive leadership, professional guidance, and outstanding and meritorious national service." The 1965 National Veterans Award was presented to General Sarnoff in Birmingham, Alabama, on November 10, 1965, for his outstanding contributions "to further the patriotic interest of veterans and veteran organizations throughout the country."

On September 30, 1966, the electronics, communications, and broadcasting industries joined in an unprecedented tribute to David Sarnoff on the 60th Anniversary of his entry into communications and electronics. In a "Salute to David Sarnoff" dinner at The Waldorf-Astoria, in New York City, approximately 1500 industry leaders and representatives joined in an unprecedented tribute and hailed the communications pioneer and industrialist as a man "whose vision and leadership helped to shape a new age of progress." Recalling his start as a young immigrant who began his career on September 30, 1906, as office boy for a wireless telegraphy company, industry spokesmen and leaders of three national organizations paid tribute to him as an "organizational genius" and described his achievements as "an enduring monument to progress."

Three leading organizations in the communications fields—the Electronic Industries Association, the Institute of Electrical and Electronics Engineers, and the National Association of Broadcasters—co-sponsored the dinner and program. Frederick R. Kappel, Chairman of the Board of the American Telephone and Telegraph Company, served as program chairman at the dinner. General Sarnoff was the recipient of hundreds of congratulatory messages from across the nation and throughout the world.

A gold commemorative medallion, presented to General Sarnoff by the three organizations, cited him for "sixty years of service to industry, the nation, and the world." General Sarnoff also was presented with a testimonial scroll which paid tribute to his leadership and

guidance "in the creation of new electronics products and services through research and engineering; in the development of radio and television broadcasting for the public enlightenment and entertainment; in the application of advanced electronics concepts and systems to the defense of liberty; in the advancement of the electronics industry as a major economic and social force." On behalf of his associates in RCA, Dr. Elmer W. Engstrom, Chairman of the RCA Executive Committee, presented to General Sarnoff his portrait in oils, painted by Charles Fox, and to Mrs. Sarnoff, a diamond brooch.

The principal speakers at the "Salute" were Robert W. Galvin, Chairman of the Board of Motorola, Inc., representing the EIA; Dr. Jerome B. Wiesner, Provost of the School of Science at the Massachusetts Institute of Technology, speaking for the IEEE; and William S. Paley, Chairman of the Board of the Columbia Broadcasting System, representing the NAB. Lowell Thomas, noted author, commentator, and explorer, acted as toastmaster. A musical program was presented by Morton Gould, conducting a forty-piece orchestra.

Mr. Kappel noted that this was the first occasion on which the three organizations had joined to honor an individual for contributions in all their fields of interest. Referring to General Sarnoff, he said: "He has made great contributions in communications, in radio, in television. He has inspired engineers. He has been a mover and shaker in electronics."

In his remarks, Mr. Galvin said: "General Sarnoff's courage, energy and foresight have propelled our industry again and again into areas of products and services considered beyond the state of the art at the time. His vision now of horizons available to us in the years ahead continues to be twenty-twenty."

Commenting on General Sarnoff's leadership and service, Dr. Wiesner added: "To me, the uniqueness of David Sarnoff lies in his combination of a visionary and determined builder and hardheaded industrial leader. He was among the first to recognize the role that science could play in modern industry."

Directing his remarks to General Sarnoff, Mr. Paley said: ". . . I welcome this happy occasion, as a chance to tell you publicly of my high regard, my lasting respect, and my deep affection for you. But enjoyable and significant as this anniversary is I, and the thousands of broadcasters for whom I speak, will never be able to think of you as a figure of the past—or even, wholly of the present. To us, David Sarnoff will always be broadcasting's Man of the Future."

Expressing his appreciation for the "Salute," General Sarnoff called it more than a tribute to an individual. "We have come together, in the final analysis, to salute six decades of electronics history and the countless men and women whose brains and labors and courage have woven the tapestry of that history," he said. Sarnoff characterized the leadership of electronics as "men of exceptional creativity and daring, impatient of the static and the routine." He referred to competition as a logical and necessary accompaniment of change and growth. And he added: "We can wear our competitive scars with the pride of veterans for they have been earned on a great battlefield for the common cause—the advancement of the electronics art and sciences for the public benefit."

General Sarnoff said there was no reason to doubt that the con-

tinuing progress of science and technology could provide solutions to most of the material problems that face the world. "Our chief concern," he noted, "must be with the spiritual, social and political progress of mankind. In the final analysis, it is the use to which the new invention is put, and not the invention itself, that determines its value to society." He concluded: "In the past sixty years, our attentions have been focused primarily on the means to translate scientific knowledge to practical ends. Now I believe we must involve ourselves in the social applications of technology with the same energy and devotion that we give to its development. As the creators of progress, we share a new and fundamental responsibility to the purposes it serves. This is a challenge to us as individuals and as electronic pioneers facing the world of tomorrow. It is worthy of our finest talents."

General Sarnoff is a member of the National Institute of Social Science, the Academy of Political Science, Veteran Wireless Operators Association, the Radio Club of America, Newcomen Society of England, and a member and past president of both the Armed Forces Communications and Electronics Association and the Economic Club of New York. He is a fellow of the Institute of Radio Engineers, Royal Society of Arts (London), Honorary Member of the British Institution of Radio Engineers, and a member of numerous other scientific and social groups and associations, including Tau Delta Phi and Beta Gamma Sigma Fraternities, Metropolitan Club, Army and Navy Club of Washington, and The Federal City Club of Washington, D.C., India House and Lotos Club of New York City, and the Century Country Club, Purchase, New York.

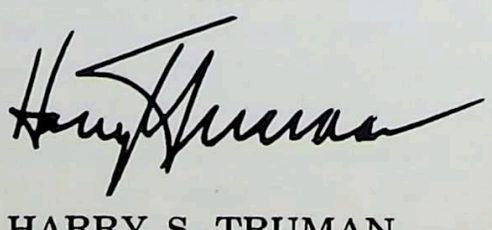
David Sarnoff's Honorary Degrees include Doctorates of Laws, Science, Engineering, Commercial Science, Literature and Humane Letters. President Lyndon B. Johnson has said, "General Sarnoff's decorations and awards are numerous, but the list of his achievements is far longer. On behalf of a grateful nation, I salute him and hope we have the benefit of his creative genius for many years to come."

General and Mrs. Sarnoff were married in 1917 and live in New York City. Mrs. Sarnoff served for more than thirty years on the Board of Trustees and as Chairman of the New York Infirmary volunteer services. During World War II, Mrs. Sarnoff was Chairman of the Red Cross Nurses' Aide Unit of the New York Infirmary. In 1965, Mundelein College conferred upon Mrs. Sarnoff an Honorary Degrèe of Doctor of Humane Letters. They have three sons, three granddaughters, and five grandsons. The sons are Robert William Sarnoff, President of RCA; Edward Sarnoff, a New York businessman; and Thomas Warren Sarnoff, Vice-President in charge of NBC on the West Coast. All three are veterans of World War II: Robert, Lieutenant, United States Navy; Edward, Captain, United States Army; and Thomas, Sergeant, United States Army.

Sarnoff's is a difficult personality to understand, a complex personality especially for those who have not known him well. Sometimes people may differ from him until they meet him, but they invariably agree with him once they talk to him. The secret is that he tries to understand their viewpoint as much as he persuades them to understand his. His approach to every problem is broadly human and based on truth and tolerance. As active in citizenship as in communications, Sarnoff has served the government in an advisory capacity under six Presidents of the United

*Former President of the United States, Harry S. Truman, being interviewed by NBC news correspondents while taking his daily walk on a New York street. The man from Independence, Missouri, who is an eminent recipient of the Wisdom Award of Honor, stopped his formal education after high school and worked as a newspaper mailing clerk, railroad timekeeper, farmer, bank clerk, haberdasher, artillery captain, county judge and senator before becoming vice-president.*

Through his brilliant leadership, his integrity of purpose, his never failing devotion to his country, and by his great achievements, David Sarnoff has contributed immensely to the growth of America and its pre-eminence in radio, television and electronics. He placed the full resources of his company at the disposal of the Army whenever needed, regardless of the additional burden imposed upon his organization. He encouraged key personnel to enter the service, and at his direction RCA engineers and technicians rendered special assistance on numerous complex communications problems. He fostered electronic advances which were adapted to military needs with highly beneficial results. The wholehearted spirit of cooperation which General Sarnoff inculcated in his subordinates was of inestimable value to the war effort. The world owes him a debt of gratitude for his farsightedness, his personal and moral courage, his lofty and magnanimous spirit, and his great support of democracy, justice, freedom and world peace.

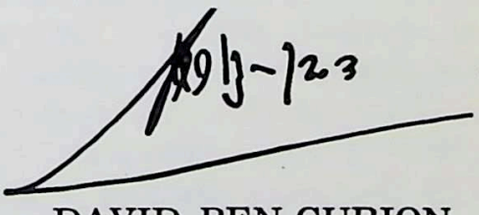


HARRY S. TRUMAN
*Former President of the United States*

*David Ben-Gurion, former Prime Minister of Israel, presenting former President Truman with an ancient brass Menorah, a priceless candelabrum used in King Solomon's Temple.*

*When Ben-Gurion appeared on the NBC-Television Wisdom Series, he talked from his home in Tel Aviv. In his conversation, he contrasted Israel as it is now with the wilderness he first saw. He described the spirit and achievements of his people, and commented on his studies in philosophy, religion and government.*

David Sarnoff has never hesitated to undertake a colossal task or to meet a tremendous challenge. He has always done so with a brilliant mind and a powerful determination which reveals the greatness of his spirit and the depth of his genius. His influence on world development stems from the fact that his approach to international problems is based on a determination to meet the forces of our time and to utilize them in a constructive manner.



DAVID BEN-GURION
*(Signature is in Hebrew.)*

*General Sarnoff visited Prime Minister David Ben-Gurion in Israel in 1952. Sarnoff received an honorary degree from the Weizmann Institute of Science in Israel in recognition of his services to the advancement of electronic science.*

States. His unstinting devotion to our nation epitomizes our finest traditions and provides an outstanding example to all Americans.

Among the most admirable qualities of Sarnoff is his ready disposition to listen attentively to others, though he himself is a wonderful conversationalist. This is a quality of statesmanship of utmost importance, as it is the vehicle for consolidating mutual understanding rendering any discussion interesting and fruitful. It marks Sarnoff as a great intellectual and brings out the successful diplomat in him. It is also a reflection of his qualities of patience, sagacity and wisdom, which have made him what he is today.

Sarnoff's love of service to others has been a natural trait of his character. But people have at times tended to misjudge him and describe him as a man of moods and impulses. Impulsive he sometimes is, but his public speeches reveal that behind and underneath these outbursts of momentary feeling, there is in him a deep and unchanging purpose which has swayed his thought and action since the beginning of his life. Many have been attracted by his personal charm and the brilliance of his conversation, but the strength of his will and the tenacity of his purpose have not always been fully realized. The dominant impression left on us is of a man perpetually drawn between emotion and a superbly cool-headed intellectualism. Many a time—both in conference and in private conversation—Sarnoff seems to be on the verge of being carried away by his emotions, but on each occasion his superb sense of realism and his fine intellectual appraisal of the issues under discussion pull him back and the final result is invariably a sound, unshakable balance. This is one of his great qualities. His undisputed leadership in the fields of radio, television and electronics has enabled him to project this personal characteristic on the sphere of American business and industry. He has stood through many conflicts for many years, and he has stood with his feet firmly on the ground, unswayed and in perfect balance. The balance between emotion and intellect in Sarnoff's individuality thus projected itself on the individuality of American industry.

Sarnoff possesses the peculiar capacity of not only absorbing the ideas, sentiments and aspirations but sometimes also the passing moods of his people. He has an intuition, almost a power of divination, which enables him to probe into the minds and hearts of men, whether they are intellectuals or ordinary folk. Further, he possesses the unique capacity of dealing with the mental and emotional processes of even an incongruous or heterogeneous concourse. He always has his finger on the pulse of the people, and is never out of touch with modern social trends.

Here is a man who strips away pretenses and faces hard facts. Even with an enormous number of achievements behind him, he often expects the worst, and holds himself in constant preparation to meet it. But, on the other hand, he is a true man of action—sanguine and optimistic, confident in his power to meet and overcome circumstances, however difficult, and sustained by a strong spiritual conviction of the rightness of his cause. He is much given to hope and convinced that in the end the right will triumph.

Sarnoff is certainly well fitted by appearance and deportment to the role of the communications and electronics tycoon. At seventy-seven, he is an impressive figure—a short (approximately five feet five inches), stocky man with a ruddy, alert face, sharp blue eyes that shine with an impatient energy, a buoyant bearing and an air of authority and assur-

ance that only a few people—General Dwight D. Eisenhower, for example—habitually convey. He has an aesthetic sense which is at once simple and dignified. If things are not in their proper place, it irritates him. He is allergic to untidiness, rough manners and lack of etiquette. His requirements in life are few. But he would like to have them neat and clean just the way he wants them. And he is a very reliable and responsible person. If he says he will do something—whether it is a small matter of sending a book or some money of assistance, or something very big in which great risks are involved—he always stands like a rock against adverse winds and always fulfills whatever he promises.

Another noble quality that men have found in Sarnoff is that he never speaks ill of others. Even if he criticizes, he does so in restrained language and more in sorrow than in anger. Whatever he has to say he says straight to a man's face. That is why he has never posed as a saint. But even his bitterest critic will not fail to concede that he is a thorough gentleman. And he detests interruptions. They offend his sense of orderly thinking. Of course, he has his likes and dislikes. Like most men. And such feelings are not always rational. Yet, he has the rare gift of probing deep into a person's mind and character, and his opinion of people is uncanny and rarely wrong.

In his dealings with others he is generous—generous even to a fault at times. He likes an aggressive personality and enjoys the company of a versatile intellect. A keen intellectual with a good command of the English language invariably makes a favorable impression on him. If that is coupled with etiquette and manners, Sarnoff feels completely at ease. He takes human failings in the natural order of things and, therefore, sometimes ignores them. But he is uncompromising with those who lack faith or are devoid of will and effort. He always approaches both his friends and others with a good heart and without ill will even with regard to those who oppose him. Then, there is his spirit of detachment which is another one of his great qualities. Few men have this virtue to the extent Sarnoff has. He has had his sorrows and bereavements. But he gets over them in the spirit of the ancient Hebrew Talmud, knowing that one must not mourn for what is inevitable.

The force of his inexhaustible energy and efforts is his rich personality, but he has always sought to build a team—especially a solid second echelon of younger executives—and to have colleagues at RCA who share his confidence. He is not alone at RCA, like the peak of a cone. There is a clear line of command under him. Sarnoff's discernment of ideas is near-infallible, and his choice of persons for their implementation is often right. As RCA Chairman, Sarnoff lets his son, President Robert W. Sarnoff, handle most executive details. The brilliant young Sarnoff is thus the corporation's number one heir apparent. And there are quite a few able younger men coming up. Thus, to inspire men is important, Sarnoff believes, but to weld them into a team is equally necessary. Especially when RCA is constantly expanding into new territory. To discover the rocks on which the church or temple of one's inspired dreams can be raised is a part of the measure of a prophet's greatness. It is here that the judgment of history is likely to be kind to Sarnoff. The combination of common sense realism with a lofty imagination, of a rocklike standing by tried traditional values with a readiness to try out new ideas and inventions, of a monumental endurance with a responsive flexibility of mind—that is what is characteristic of the man.

What his associates value greatly in Sarnoff are his infectious energies and his quick and favorable reactions to new ideas. For, by some magic, he has managed to maintain the outlook and zest of a young man throughout a long life—as if there were in him some spring from which he perpetually recruits his energies and powers. The men of his organization, many of whom are much younger than he, have never been able to keep pace with him, because his dynamic and progressive mind passes from one subject to another with astonishing rapidity. What is it that is responsible for this phenomenal energy in a man who is seventy-seven years old? No discussion of his technique of work can begin without some explanation of this extraordinary vitality.

Then what has been the dominating feature of Sarnoff's personality? The perennial season of spring in which he seems to live, his everlasting, indestructible youth. It is true, perhaps, that he can rage and thunder and be impetuous, but never spitefully or vaingloriously. In that unique personality, there is an inexplicable charm which endears him to all, most of all to children for whom he has a special partiality and love. Industrialist, educator, scientist, philosopher, humanitarian, Sarnoff has so much of eternal spring in him that age cannot touch him. Yet, age and youth seem to mix in just the right proportion in the inexhaustible fountain of energy from which he draws his vitality.

Sarnoff is often asked what is the secret of his eternal youth, his enthusiastic mood, his alert, clear and analytical mind? It is difficult to answer this question but one has a feeling that it is Sarnoff's wonderful capacity to adjust himself to every environment. When he is with little children, he is one of them. He plays with them and talks to them in heir language and of things which they love and can understand. When ith young people, he shakes off fifty years of his age and is full of nergy and becomes one of them. When addressing college students, he peaks to them of their problems in an easy, conversational style, and carries every one of them with him. With statesmen he discusses serious world problems. With businessmen, matters of business. With scientists, latest research experiments. With industrialists, modern production methods. He is at home in every place at all times, and is free from the strain of meeting people. And he has never given anyone the feeling that he expects to be treated as a genius.

Sarnoff naturally and without apparent effort looks and behaves like somebody important. He is "news" and looks news. Throughout his career, whether in business or in government, he has always been in the forefront. In appearance, in manner, in dress and, above all in speech, he is an individualist. (He is very careful about his clothes, and dresses immaculately with conservative, expensive elegance.) In an analysis of the sources of his power and influence, it would be impossible to overestimate his tremendous capacity for work, which is enhanced by his equally tremendous capacity for relaxation. With him this takes the form not of idleness but a change of occupation. While his brain is at work he has the facility of resting his body, for the impetus of Sarnoff's vitality is within himself. And he is not careless about his health. In fact, he is very careful about it. Unlike many men in intellectual and sedentary pursuits, he has never neglected it. He is a punctual and methodical person and leads a very regular life. He never leaves things undone. Thus, no employee or executive at RCA is driven harder than Sarnoff drives himself. He is not fond of sports. He indulges in no hobbies, no

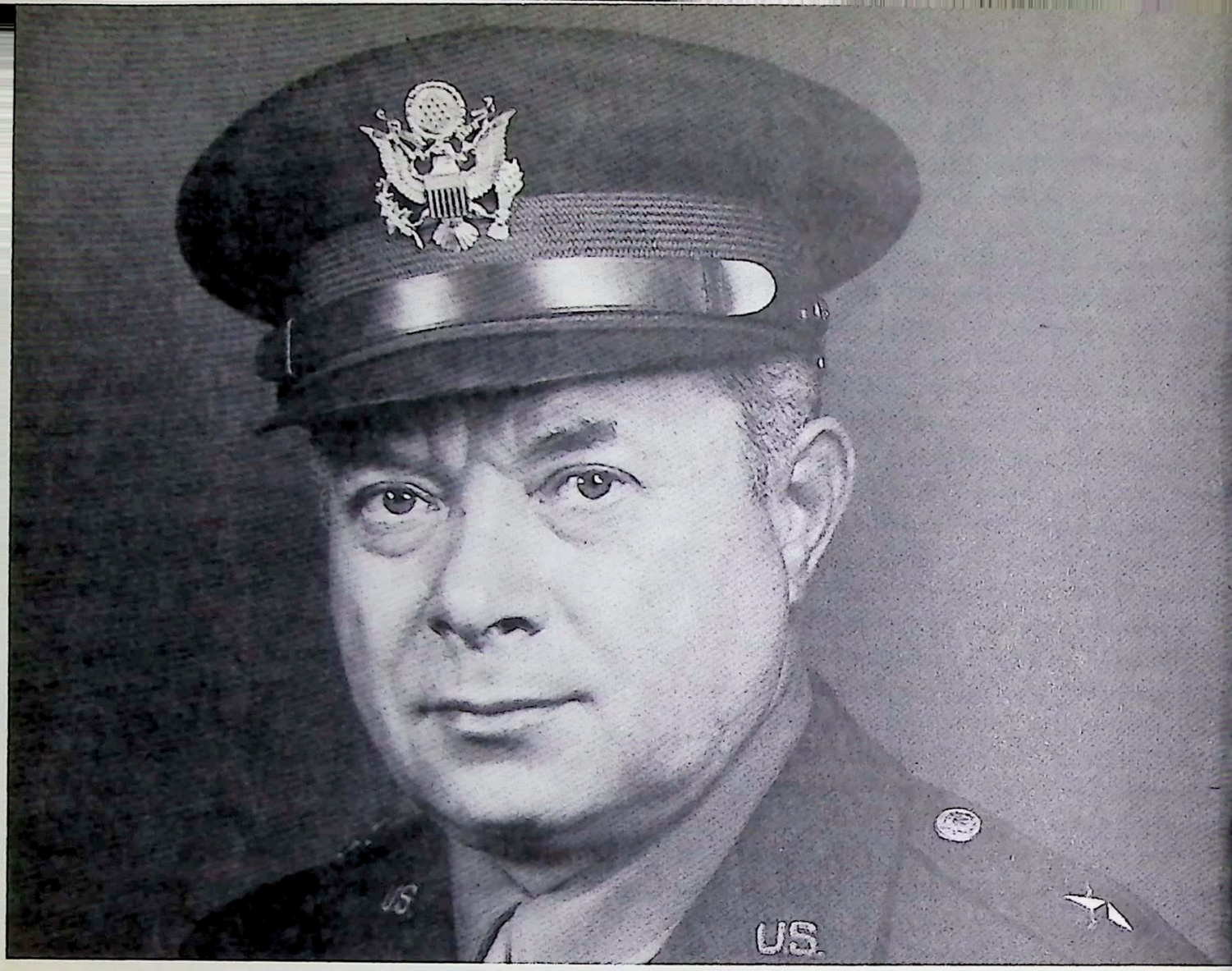
golf, no games. His appetite for his work is insatiable. Even though he works so hard, he does not deny himself the necessary sleep every night, nor does he neglect the physical exercises that suit him. He comes home at six from his office in Radio City, New York, goes to bed and sleeps for an hour or two before dinner. He recuperates quickly when tired. A masseur comes to his home each morning and gives him a massage before breakfast. This has enabled him to preserve his health to a very remarkable extent. He is also careful about his diet and knows exactly what agrees with him. He has always lived well—simply though expensively—never denying himself anything and never over-doing anything.

His home life is elegantly comfortable, and is graciously presided over by his charming French-born wife, Lizette, whom he met and married fifty years ago. The Sarnoff home in New York has six floors, twenty-eight rooms, two patios, a barber shop in the top-floor solarium, and a projection room. Sarnoff has a floor that is entirely his. Here is where he keeps his books, papers, awards, trophies, citations, plaques and honorary degrees. And this is where he reads, studies and works. The library is of course well equipped with radio and television, as are most of the other rooms of the house. Wherever he may be, Sarnoff likes to be in touch not only with his top executives but with the end product itself of his mass communications and electronics empire. His air-conditioned, chauffeur-driven limousine is equipped with a radio-telephone set through which he can keep in contact with his principal aides or with any point in the world.

Sarnoff is a man, par excellence, who believes in seeing for himself, and he has never lost that boyish characteristic of asking how it works His quest for knowledge is facilitated by his innumerable contacts in al spheres of our national life. There was never a man with more source of information. The continual accumulation of knowledge at an ever increasing rate means it is now more difficult for one man to keep pace with developments in all branches of even one science, much less of all. But Sarnoff has a peculiar sensitivity to what is happening in the world and little escapes him. With Sarnoff to read is to remember. Few men have a greater capacity for assimilating facts. Recognized as one of the best minds of our age, Sarnoff is a profound thinker of great courage, creative imagination, and intellectual integrity. And he is always searching for fresh ways and means to produce the desired results.

Although he has served America diligently for many years with selfless dedication and devotion to public welfare, and to championing the cause of increased international understanding and world peace, he is by no means a perfect man. Being only human, he has his failings. But these are really submerged by his truly great qualities. People have found him impatient when they did not come up to his standards, perhaps due to limitations not of their making or lack of advantages or resources which they did not have. Some have occasionally found him short-tempered when he could be sympathetic, because he believes that good ideas get vulgarized through inept execution. Others have found him unnecessarily impulsive and impetuous. But all that shows that he is very human and continues to be so, despite his age and his greatness. And it further shows an absence of pride in his nature. If he feels that he has made a mistake or has hurt anyone, he hastens to offer sincere apologies.

Another characteristic of Sarnoff's is that he is a very good friend



David Sarnoff's brilliant leadership and great contributions in the science, art and industry of communications are an outstanding record of service to the American people and to the nation. A man so young and vigorous—intellectually and physically—he has devoted great abilities to the advancement of the security and well-being of his fellow citizens and demonstrated a firm faith in the free economy and free institutions of America.

I can personally testify to his many creative and enduring achievements of a public nature that have contributed so much to the welfare of the American community. During his distinguished career in science and industry, his leadership has been felt in a wide field of human endeavor and his generous talents have been repeatedly placed at the service of his countrymen. I recall his outstanding service to the forces under my command before and during the campaign in Europe. A great page in the history of freedom was written in those days. Many men would have been content to rest on their laurels—but not General Sarnoff.

And the pre-eminence of our country in electronics and communications has been increasingly the result of his imagination and his sound planning. His splendid achievements have contributed much to the welfare of his fellow men and to the cause of freedom and peace in the world. Those who are working with him today tell me that his strength and energy are unabated. May it be so for many years to come!

Dwight D. Eisenhower

DWIGHT D. EISENHOWER
*Former President of the United States*

and stands by his executives and employees through thick and thin. No one can approach him without receiving his understanding. Those who have been close to Sarnoff know of his intense loyalty to people. This is something that is known to all of those who have been associated with him in any way. He often recognizes a friend in the largest crowd and greets him affectionately in the midst of the biggest men around him. He has no hesitation in acknowledging a person to be a friend, however humble he may be. He is at home everywhere and in all surroundings. And he adapts himself quickly to environment. Nobody has ever any reason to feel that Sarnoff regards himself greater or less than any one he meets. He puts himself on a level with everyone. Because, above all, Sarnoff is human. He has genuine and real sympathy for the underdog. While this natural humaneness inheres in all his noble efforts, he is also subject to loyalty—he is loyal not only to ideals but also to individuals.

Men whose lives are dedicated to public work have little scope for a play of the emotions. They are undemonstrative. This is naturally true of Sarnoff. But so long as an acquaintance or employee or executive does not fall in Sarnoff's estimation by his unworthy conduct, he can always rely upon Sarnoff for sympathy and help. And there is always a warm corner in his heart for old comrades-in-arms, the men who shared with him the trials of RCA's long, drawn-out struggles to achieve greatness. For Sarnoff is interested in ordinary people simply because he likes them. He enjoys their company and is able to find a simple human relationship with them because there is no trace of superiority in his heart. To him, the important thing is to let people be themselves, to keep them culturally free—free to create in their own style, free to think and worship and work as they will. As a molder of world opinion through radio and tele-vision, Sarnoff believes that the standards by which we should judge progress are the intangible, imponderable values of the mind and spirit.

David Sarnoff is an extraordinarily hard-working person. He is his own hard taskmaster. He seems to put in, in the course of a single day, what others would take many days to do. Anyone who knows him is struck with amazement at the amount of work that he can do. How he manages to do so much, and keep in constant touch with men and affairs all over the world all the time is difficult for ordinary men to understand. Always a pioneer, always looking ahead, he concentrates on the future and on planning for new things to come. He takes few vacations and, when he does, always manages to combine work with his vacations, so that in the end they are mostly work—daily business conferences, wherever he is, even in London or Paris.

Unshaken by the magnitude of his problems, Sarnoff shoulders valiantly his full load of responsibility, and his tenacity of purpose and patience in exposition command universal respect. Problems are his business. He takes them seriously but in his stride. His energy, his sincerity, his intellect, evoke respect and inspire confidence as they produce a sense of personal loyalty and reverence. Thus, RCA is as well-staffed and managed by top-ranking executives as any very successful corporation in America. But it is David Sarnoff who reigns supreme and guides its destinies. He inspires scientists, inventors, physicists, engineers and research men. His sway is undisputed and his hold unchallenged. He stands above the din of controversy.

However unique RCA's technological advances may be, it remains essentially a very conservative organization. Although Sarnoff may not

be an inventor in the generally accepted meaning of the term, he is certainly a most successful innovator with an ability to envision and specify the need for particular inventions. He possesses, in addition, the executive skill and corporate experience—qualities which most individual inventors have lacked—to drive his ideas right through the stages of research and development until what may have originated as an idea in his mind winds up as an actual consumer product used in millions of homes. All this makes Sarnoff's personality highly complex, but reveals at the same time his great strength and great responsibilities as well as the enormous demands made on his precious time and energy in and outside RCA.

Sarnoff is exacting, and requires untiring efforts from those around him. Yet, he has never lacked willing helpers. His aloofness from small details has served to preserve his openness of mind and ability to take a broad view of the problems. He is left free to concentrate on strategic issues and to scan the vast frontiers of electronic communications that point to a fabulous future. To him tomorrow bristles with challenges and opportunities. However, one thing can be said with complete certainty. He has carried RCA into a new epoch. Through his many years of leadership Sarnoff has brought about profound changes in scientific and productive forces which will continue to influence the course of events in America in the most decisive way. He has shattered the barriers of space and time by the dynamism of his exploring mind. Thus, his greatness has created such a dazzling halo around him that it drives the nearest of his competitors to a distance. In the scientific world of communications and electronics, he remains alone on a pinnacle at which competitors ca only look but which they cannot reach.

Being the Chairman of the Board of RCA, Sarnoff cannot afford t depend on vague and blurred visions of reality. His mind is restless, end lessly experimental, with extraordinary powers of observation. It may be that he could do his work, as head of RCA, better if he were more ruthless administratively, if he rationed his time better and elevated his functional responsibility over his feelings of loyalty and friendship. But in that case, General David Sarnoff would not be the man that America knows and admires. Part of his great appeal lies in his qualities of compassion, of loyalty, and of a burning desire to help people in distress. He is not a narrow scientist or a narrow businessman. He is a man who is at home in the company of learned men in every field of human knowledge. Many who seek to isolate the essential quality of his greatness fasten upon his astonishing vitality. It is a case of the utter triumph of the spirit over the body, of a consuming passion for public welfare overcoming the normal mechanics of the human frame.

Each problem to Sarnoff is a challenge. He does not see why his mind should not work on it. He has, in spite of an astonishing versatility, a stark simplicity of mind. And yet, his mind has never been unfertile. It has been restless, but never lazy. Thus, he does not try to isolate himself from individual problems concerning departmental controversies at RCA, even though he prefers to have before him the distilled essence of all the thinking. He likes to take into account all sides and aspects of a question, and he is possessed of that fundamental sense of fairness that makes him capable of seeing the other man's point of view as well as his own before coming to a decision. Nor does he lack tolerance for another man's viewpoint. He is not surrounded by yes-men and flatterers because

he generates a fertilizing electricity in men's minds and actions. He has never developed a weakness for believing that there is only one view of every problem and that is his own. That is why he has never lost his grip over the main conflicts facing RCA, or, for that matter, our country, but has brought a fresh mind and a new light to all problems. He can concentrate and yet not let anything oppress his mind or even linger on and make him unhappy. He deals with thousands of problems and prepares himself for a new one every few minutes. Yet, he is never tired, never wanting in sympathy. This is the secret of his vitality, his youth, his energy.

In his power to influence and persuade, Sarnoff has another great asset—his dogged determination. If he cannot win his way in an argument, he proposes the adjournment of the meeting to another day when he will appear again, reinforced with new and weightier evidence, facts and information—and renew his attack. He never gives up and he never accepts a negative for an answer. That is why he has such great concentration of mind and can attend to many duties, one after another, in a very regular and methodical manner, without allowing himself to be ruffled by the enormity of work or worried by its complicated nature. He does not seem to carry any burden of work or anxiety. It is astonishing to his colleagues how much he knows and how easily he carries the load of information he possesses. And in each case, Sarnoff has been able to grasp scientific principles, appreciate the possibilities, and put behind his scientists, engineers and physicists at RCA all the weight of his authority, always spurring them with optimism and confidence to achieve the impossible. His interest in the ideas of the human mind is scarcely to be described, because his own mind is omnivorous and encyclopedic, reborn each day, with a mingling of scientific curiosity and philosophic contemplation. He never counts the cost of personal labor, or regrets the hardships imposed upon him by his ambitions. There is always some idea in the world to hearten him, some phenomenon to be investigated.

Although he lives in a world where fantasy is converted into fact and where imaginative ideas become realities, Sarnoff's mind ranges not only forward but backward. Faced with finding a solution to a problem, he likes to consider all that has been done in searching for a solution in the past. And his mind is astonishingly well stocked with a remarkable amount of varied knowledge which, when the occasion arises, he supplements by demanding all the facts—suggesting a new line of examination in the light of better knowledge. This done, he will order new research, fitting bits of the old into place until something quite new emerges. It is this combination of qualities—curiosity, imagination, great reasoning power, administrative ability—that is unusual and has enabled Sarnoff to play his unique part in the advancement of communications and electronics. This is in keeping with a personality that has always been eager and inventive, possessing ability to assess not only others but himself with clarity and candor.

Sarnoff appreciates public applause but he does not allow such plaudits to turn his head. Over the years, much has been written about him and his tremendous achievements—millions of words in newspapers, magazines, research journals and books the world over. It is because few men have been in a position to view the developments of this century from the vantage of Sarnoff's experience and perspective. Few have been as intimately associated with so many great figures of recent history. And

few have been so closely involved with the crucial issues of our age. So Sarnoff is pleased with whatever success he has achieved, but he is too honest a critic to overlook any of the shortcomings of his work and too sensible to accept the verdict of the majority for more than it is worth. Unlike many important business leaders, his social conscience is greater than his desire for wealth. In whatever enterprise he has ever engaged, the most emphatic impression of him is that of a man with a mission beyond material gains. Nothing is more obvious about Sarnoff's genius than its profound sanity, soundly anchored in his common sense and common experience, his good humor and enjoyment of normal humanity.

Many ideas that have sprung fully armed from the fertile Sarnoff brain have not, of course, been perfect. But at least they have always been stimulating. Courage is the key to his character. Generosity, candor, openness of mind, he has as reserves and no shams, and a mind acutely responsive to noble impulses. That is why scientists, physicists and engineers, even those with whom Sarnoff has entirely disagreed, have found listening to him so educative. Sarnoff, perhaps more than any other industrialist of our age, honors science and has encouraged its exponents. But he is also deeply convinced of the limitations of the scientist, and is opposed to the notion that a world ruled by scientists would be happier.

The essential fact about Sarnoff as a thinker is that he has never recognized a barrier between thought and expression. For him, to think is to feel, and to feel is to act in words and deeds. Such swiftness of response puzzles and at times irritates slower minds, for his expressions are characterized by directness and strength. And they also indicate that there is no inner conflict or division in his mind. Whether it be an object of nature or an experience of man, it evokes in him a response charged with the full strength of his personality. In the common man indignation against existing wrongs is dulled with the passage of time. Sarnoff knows no such respite. Time and growth of experience have increased the intensity of his feelings, until they no longer let him rest in the world of his imagination. Sympathy with suffering have led to the same result.

Although his enthusiasm and confidence are infectious, his impetuous nature, his intense dislike of anything that savors of injustice, weakness or inefficiency sometimes makes him lash out in criticism. Years ago he discovered that he could no longer remain in the shell of his personality but had to march out to take his place on the battlefront. This has been Sarnoff's destiny. For his imagination would not let him rest until he had flung himself into the arena of world affairs. Because he is a man of ideals aiming principally at raising the level of humanity, he is a person of rare courage. He does not know what fear is. Morally and socially, physically and intellectually, he appears to be absolutely fearless. This is a great virtue and not many have it. To him what matters most is that the individual should take pride in having served his country. And that the public should honor those who have served. General Sarnoff has always at heart been a soldier, and he has never lost the instincts of the ordinary fighting man.

Sarnoff is a man of independence of thought and action. He is not afraid to express himself, because he is a man of universal culture in the widest and best sense of the expression. He has become the most articulate spokesman of our generation about the world of tomorrow. A man of ideas born of study of books and widespread contact with people, he has had rare opportunities for studying men and affairs, and whatever he

*Sarnoff is responsible for RCA's developing for the United States Navy the world's most powerful radio station located at Jim Creek Valley in the State of Washington. It can reach ships anywhere at sea. General Sarnoff sent the first message over this transmitter in 1953 with Admiral Robert B. Carney, Chief of Naval Operations, which was directed to all ships and Navy outposts throughout the world.*

Belonging though he does to a past generation, David Sarnoff spearheads the present generation and foresees the future. He merges in himself the role of three generations—the previous, the present and the next—not to speak of the generations unborn. His greatness has helped many Americans to regain their faith in themselves, and self-respect as human beings, because his life has been so gloriously devoted to the universal happiness of the world. And perhaps this is the greatest contribution a man can make to the progress of his fellow men and to the advancement of human dignity.

JOHN F. KENNEDY
*Former President of the United States*

*General Sarnoff (left), who conceived the idea of military TV 20 years before, saw it put to a test in 1954 at Fort Meade, Md.,*

has to tell about life is extremely well worth listening to. For more than sixty years, he has expressed himself on national and international matters. And the volumes of his speeches are a history in themselves of these tremendous years. Many of his imaginative words will live as examples of human speech at its highest and best, and they will be woven into the fabric of America's history and the history of the world. They proclaim the greatness of our past and the nature of our great traditions. They shed a clear light upon the path of duty, and they implant in men and women the resolve to make life beautiful and useful. Many of those speeches which appeal to the noblest and deepest feelings of mankind will remain a great possession for America, whose interests they preserve and maintain.

Sincerity, directness and vigor are in evidence in every paragraph. And yet the whole work of his public speeches is based on instinct with a searching of the spirit and a sense of quest. A feeling for the drama of life is matched by a sense of impending events and a deep insight into the motives of man. The power of searching analysis into the mind of man tends to make Sarnoff introspective. A feeling for the broad movements of history encourages in him, on the other hand, an attitude of objectivity. To the searching, critical and questing spirit of this essential man of communications and electronics has been added the sweep of a poet's vision and the magnanimous imagination of a humanist.

Sarnoff's words of wisdom in his public speeches express the manifold aspects of his rich personality more adequately than perhaps anything else he has done. With the artist's sensitiveness to pain, he combines the fighter's indignation against wrong. His flaming words bring cheer to depressed minds. His voice rings through the darkness and brings a ray of hope to those in despair. His exquisite expressions of the fleeting and evanescent feelings of the heart evoke a response in all sensitive minds. Of this he is more than conscious. Therefore, he speaks from a prepared text. His method of preparing a speech is to dictate and revise the result, not merely once but as many times as are necessary for the writing to satisfy him. When Sarnoff is going to speak in public, he gives immense care and thought to every word, sentence, and phrase, in preparing his speech, to insure that misinterpretation is impossible.

Sarnoff's love of words and phrases stands out in all his lectures. He has the gift of language appropriate to the occasion. He has a sensibility to the sound and music of words. He possesses the supreme gift of being able to choose the right word not only for its sound, but with an instinctive knowledge of its emotional meaning. And much of his power to hold men's minds and to enthrall their hearts lies in the fact that Sarnoff is the possessor of the magical gift of putting the right words in the right order, at the right time, and in the right place. How much this is due to patient and prolonged labor and how much to sheer native genius, it is impossible to say. But his speeches are never dull and sometimes reach the most inspiring heights of which our language is capable.

It is an experience for a person to attend a meeting, banquet, public function or college graduation and to hear him address the audience. Unlike an orator, he does not commence on a bold and emphatic note or end with a carefully prepared rhetorical peroration. His voice begins quietly, and almost imperceptibly it rises to a height of passionate pleading and fades away at the end into silence. And his listeners are greatly moved by his sincerity and restraint. His emotional nature and

his innate independence of thought have helped him in developing a style of expression which is direct and captivating. It is quite extraordinary what detail seems to be stored in his mind and how his memory will produce the apt word at the right time.

Sarnoff's speeches are never of the conventional type playing upon the feelings and sentiments of his audiences. When he speaks he is both convincing and forceful. And always at his best. His speeches are never rambling, never trite, never unreflective. There is always a touch of historical perspective. He knows how to play on human psychology, for he speaks with a faith and confidence which is rare among great men. That is why on all occasions when he speaks, banquet rooms, halls, college and university auditoriums are packed to capacity. This is indeed a rich tribute to a man who is acknowledged to be one of the most consummate public speakers that America has ever known.

His love of life and of people shines out from all his speeches. Not only is he patient and persistent in the pursuit of values which really matter to him, but there is in his character a degree of forbearance and toleration which the casual listener is likely to miss. In his speeches, Sarnoff has interpreted, and indeed interpreted well, the urges and aspirations of the American people as well as those of freedom-loving countries. In his public utterances, he has paid many notable tributes to his adopted country—America—but it is in private talk that the depths of his devotion to America are unveiled. His words of wisdom show how deeply he has gone below the surface of contemporary life and how deeply he has studied the movement of the tide in the affairs of men. From his lips emerge words that speak of freedom—words burning, passionate and irresistible, words that cut deep into the minds of all those who listen, giving them confidence, hope and an unswerving resolve. There is, moreover, one form of speaking in which Sarnoff excels, though it is impossible to illustrate his eloquence by citation. This is conversation—talk on those private occasions when language is given to us to reveal not to conceal our thoughts. According to Sarnoff, the conditions requisite for conversation are that bodies should be relaxed but minds active. Through long tours and lengthy speeches, Sarnoff has tried to reason with his fellow men, and to impress upon them the urgency to march ahead. He knows that his country is rich in many things, and he has faith in the innate intelligence of the American people.

Having touched life at many points, Sarnoff comments at large upon men and things, distilling in aphorisms and epigrams, in maxims and exhortations the ripe fruits of his mellow experience. Can Sarnoff, supreme man of action as he surely is, also be regarded as a philosopher? His writings and speeches leave no doubt about it. On the other hand, he is as much capable of action, of fighting for his thoughts and ideals, as he is of expressing them. He believes that experience has ripened in him a faculty of insight which enables him to see further into things than his fellows, and to embody what he has seen in wise observations. He makes it his business to inquire into the nature of this puzzling universe in which our lives are set, with a view to throwing light in the course of his inquiry on the meaning and purpose of human life. His speeches are examples of superb narrative, for he has the power to marshal complicated facts into the most lucid exposition. Some of his great passages have already gone into the common speech. And his words of wisdom will be upon the lips of generations to come.

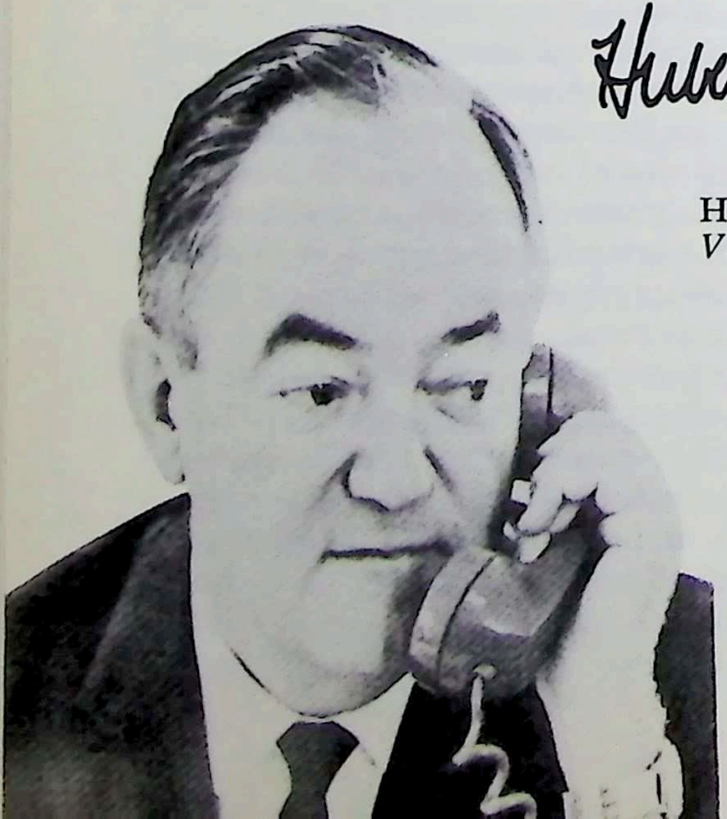
David Sarnoff's career is a saga of Americanism. His tremendous achievements have been written indelibly into the history of our times. He is a man of genius who has revolutionized world electronic communications. But not even living color can do full justice to his remarkable career and superb achievements.

General Sarnoff has been a prophet and a pioneer. With courage and enterprise, he has taken great economic risks, overcome formidable technical obstacles so as to advance the state of the art and the well-being of the land we love. But the best of General Sarnoff is yet to be. I will not be surprised to read in tomorrow morning's papers that he has "done it again" and has proposed some new technical miracle to add to the many advances which he not only proposed but has translated into useful reality.

Patriot, builder, benefactor, David Sarnoff is a credit to his great company, to the broadcasting and related industries and to the nation he has served so well. He deserves our best praise and continuing gratitude—for many years ahead—because he is one of our great and very best Americans.

Hubert H. Humphrey

HUBERT H. HUMPHREY
*Vice-President of the United States*



*The loquacious, fast-thinking, brilliant Vice-President of the United States, who has been called "the most effervescent intellectual who ever served in the United States Senate," is an eminent recipient of the Wisdom Award of Honor.*

There are a thousand descriptions of Sarnoff the public speaker in action from those who have heard him—descriptions of the voice, the eye, the gestures, the passion and the fire, the humor, the grace. Future historians will be able to give a pretty clear picture of Sarnoff, and they will speak of him as one of the greatest of public speakers. And this great figure who dominates our age in communications and electronics will take his destined place in the long and noble line of those who, in serving their day and generation, have been clothed with a kind of immortality. The name of David Sarnoff is so intertwined with the history and development of electronic communications, that educators believe that the editors of our dictionaries before long will feel obliged to add the word "sarnoff" to the English language. It will mean "a leader, an expert, an adventurer in the world of communications."

Sarnoff's is essentially a modern mind—scientific, objective, receptive to truth, impatient of obscurantism. His enthusiasm for scientific education, technological institutions, and research laboratories, his frank, childlike pleasure at the development of great electronic projects stem from two fundamentals. First, using science as an instrument for raising the people's standards of living, and for providing them with full and equal opportunities for growth. And, second, making science teaching contribute to the cultivation of a scientific outlook, which is more important than just acquiring scientific knowledge. It is clear that Sarnoff seeks to build a bridge between science and moral values. Being a clear-sighted thinker, he knows that science and technology are not enough. He sees that much of our technological progress has led to disaster, which can only be averted if we can develop the spiritual elements in life.

In communications and electronics, Sarnoff's leadership has been very clear and definite. He has always taken a keen interest in electronic research and the progress of science and technology in general. He took the tiniest speck of energy, the electron, and created a whole new world of communication, of information, of entertainment, and all of it through the wonders of radio, television, and color television. It was due to his personal interest that a large number of national laboratories have come into existence and large resources have been made available for the development of research. It was again because of his leadership that increasing attention is being given to the training and expansion of technical and scientific man power.

For years Sarnoff has been acting as a great teacher and educator to put across his ideas in simple language to Americans all over the country whom he meets in the course of his frequent and far-flung tours. All our knowledge and experience and technology put together, he believes, do not necessarily represent a growth in the wisdom of the human race because they have not resulted in the adoption of the right approach to life. He feels that it is through education, science and culture that we can impinge fruitfully and constructively on this situation. He expects all educational institutions to discharge this sacred duty, from the elementary school to the college and university. His insistence on right objectives and values—which are certainly intellectual but go beyond the intellect—characterizes his approach to education at all stages.

Sarnoff's interest in culture and particularly in arts is not merely subjective in that he is just satisfied in drawing pleasure and interesting himself in these pursuits. It is also demonstrative. He likes to identify

himself with such activities by public association. One, therefore, finds him burdening his schedule by lending his patronage to cultural shows, musical programs, art exhibitions, giving aid to dramatic activities, encouraging and helping literature, dance, music, films, painting, sculpture and other arts—in spite of his many other duties and responsibilities. His demonstrative identification with cultural activities has had a great psychological impact and has served to raise the status of American education.

In some ways, Sarnoff's basic role has been that of a teacher of his people. Today, at the age of seventy-seven, when most men are content to recount and sum up their accomplishments, Sarnoff looks for new worlds to conquer. He has certainly led his corporation, RCA, to great financial success and distinguished scientific achievement. But, being largely self-taught, and having great respect for the minds of others, his deep concern throughout has been to educate his fellow men in right values and attitudes—especially our youth. This interest is not confined to education in the institutional sense. It is deeper. It arises from his view of the ideals which should inspire life, his understanding of what culture means, his assessment of America's past and present, and his vision of the destiny she should strive for. It takes its direction from his appraisal of the new forces developing in the world today. Thus, his view of education is rooted in his view of life.

For Sarnoff, one of the important problems of education is to restore the supremacy of the mind and spirit in life, which is being threatened, curiously, by some of the most magnificent material creations of the mind itself. Sarnoff is primarily interested not in expensive buildings, but in people. And he is anxious that our resources should be spent on the educational process, on teachers and children, rather than on bricks and mortar. Sarnoff's interest in education stems basically from his interest in people, for, what is a good social order but the means for nurturing a good human character? And his interest is even more in children, for whom he has the true teacher's solicitude and affection. His whole life is permeated with love for children. But Sarnoff knows that the modern age does not, unfortunately, provide a favorable environment for developing human character. The noise and din of civilization prevent men from thinking. That is why, according to him, the present-day world is getting out of tune with the life of the mind and the spirit. While in specialized domains of science and technology and knowledge in general, the mind is active and dominant, it does not play its proper role in controlling human aims and purposes.

"The inner crisis of our age," Sarnoff believes, "is simply this: will men realize that true humanism requires that our spiritual and moral growth keep pace with our scientific and technological growth? True education perfects man inwardly and bestows upon him the control of himself first, and then the gift of mastering the physical universe. The moral and spiritual universe is the inner soul of man's physical universe. Weaken the soul, deny the spirit, dilute the moral principles, and the body of this world will enslave or destroy mankind. The greater man's insight into physical power, the greater his need of inner wisdom and integrity to control and order this power.

"The present-day wonders of science are not to be feared—unless man is stupid or evil, and then it is indeed that man who is to be feared. But the good man may safely discover the wonders of this good world

that God has made. He may glory in his discovery. He need only to use wisdom as the guide of his freedom, and to school his freedom in the integrity that respects wisdom: that all of the good things of this world may be used to glorify their Creator, and benefit man created in the image and likeness of God. But let them benefit him mainly in the inner likeness of mind and will—that truth may reign, that integrity may characterize our freedom, that beauty of soul may give ultimate meaning and order to our unfolding world. To inspire such endeavor is the work of education, an inherently optimistic work in a world of fear and pessimism."

Another important characteristic of Sarnoff's educational thinking is his appreciation of work as one of the basic values of life. He condemns the idea that work is undignified and that the less work one does the higher is one's status in society. That is why he gives high place to physical fitness in the scheme of education. It is everybody's duty, he feels, to be healthy and strong. He has always had an acute dislike for illness and feebleness, hence, his emphasis on high standards of efficiency in everything.

If education means opening the doors and windows of the mind, Sarnoff has made a remarkable contribution to changing the pattern of our thinking and developing a progressive, dynamic, and liberal approach amidst the forces of social reaction and intellectual obscurantism. He has aptly pointed out that, like a tree, a culture should be not only rooted in the soil from which it draws its strength and stability, but open to sunlight and breezes from outside from which it will draw its freshness and increasing vitality. Education has, therefore, to prepare the minds of young men and women to welcome all that is good and worthy and life-giving in our culture, and the cultures of other lands, and to reject whatever is narrow and unworthy, even though it may have the stamp of tradition and time.

In Sarnoff's opinion, there are great values to be learned. These values are tolerance, compassion, a relentless search for truth, a readiness to welcome life from whatever source it may come, and to appreciate the viewpoint of others. Any system of education which fails to develop tolerance or devotion to truth, even against one's own interest and conviction, or a readiness to understand—is defeative. Sarnoff's emphasis throughout is that education must not merely provide efficient training in skills and knowledge, but also enrich men and women with wisdom and humanism. This implies an integrated view of life and, consequently, of education—a view which will balance the claims of the body and mind, the individual in the community, the material and the ideal. Sarnoff's essential preoccupation is with what he has variously called the crisis of the spirit over the crisis of man—something which is happening the world over. This is the basic disease which education must eradicate. And he has warned us that if we do not pay heed to it, our fine ideals and good work will be shattered into nothingness.

A great deal could be said about Sarnoff the educator, but enough has been written to indicate his great interest in education, his sensitive awareness of its basic issues, his appreciation of the deep and meaningful relationship between education and all other forces that play on life. Like the dedicated teacher, he has faith in the destiny of man and is not obsessed with pessimism because dark and ugly forces happen to be present in our time.

Sarnoff is also well known for his love of beautiful objects. He has bemoaned the fact that people seem to be losing all idea of what beauty is, and are surrounding themselves with and taking pride in a lot of things that are anything but beautiful. Perhaps, he thinks, it is symptomatic of the modern age. He, therefore, appeals to all Americans again and again, in his public speeches, to create, collect and preserve objects of beauty from the past and the present so that we may at least have good aesthetic standards by which to judge. He pleads also for the children in whom he has an abiding and passionate interest. Why not have beautiful things and why not train them in the appreciation of beauty from their childhood instead of giving them toys which are caricatures of what they see? Such toys may no doubt excite their curiosity, but at the same time they make them insensitive to beauty.

Although Sarnoff is essentially a man of communications and electronics, with undoubted faith in their progress and achievements, at the same time, and at the back of it all, there is in him a spiritual spark which is marked. He is convinced that there is a Supreme Force over the universe, and his religious feelings deepen as time passes. While placing full reliance on the development of science and harnessing scientific knowledge for the eradication of misery, poverty, ignorance and disease, he is conscious of the limitations of such material progress without submission to some kind of a spiritual principle. His greatest virtue is his ability to believe in God, for no one believes more sincerely and deeply in Goodness and Truth and Love than does David Sarnoff. For him faith transcends reason, and belief in God has come to his rescue and has been for him the anchor that it has been for so many great men during periods of storm and stress, whereby they were able to face and surmount crises.

As a reaction against current cynicism and materialism, Sarnoff predicts, there will soon be an upsurge of spiritual vitality. The gradual elimination of physical hungers will deepen the more elemental hunger for faith and salvation, for age-old values beyond the material and temporal that gnaw at the heart of man. "Science begets humility," he explains. "Its every discovery reveals more clearly the Divine design in nature, the remarkable harmony in all things, from the infinitesimal to the infinite, that surpasses mortal understanding. The physical processes and laws of the universe are logical, all-embracing and wholly dependable. They imply a Supreme Architect, and the beauty and symmetry of His handiwork inspire reverence. It may be that the imperfection of man, too, is a part of that creative symphony. The seed of moral perfection has been planted in man, but it has been left to him to nurture it to full flower in the harsh soil of mortal existence. Thus man is given a positive role in carrying out a phase of the blueprint of the Supreme Architect."

Because he is greatly inspired by the history of man, Sarnoff moves with the conviction that the world is one and that the faith of man anywhere is influenced by what others do everywhere. His activities reveal that he is moved by a profound sense of responsibility to the world at large. Through many years of indefatigable and devout humanitarian service to his fellow men at home and abroad, regardless of color, nation or creed, in accordance with the precepts of the Hebrew Prophets and the great Jewish Sages who regarded efforts to increase respect for human dignity and peace among men as among the foremost Command-

ments, Sarnoff has followed the concept of the verse from Genesis, "And God created man in His own image, in the image of God created He him," and has truly worked to make brothers of all men.

Thus, he looks upon freedom in its broadest and most comprehensive sense as freedom from want, fear and tyranny in any shape or form. The fact is that Sarnoff hates anything which lowers the dignity of the human being, as modern war does, as serfdom and tyranny do. Freedom is always dear to him, and suppression of the freedom of small countries touches him deeply. Yet, undeterred by this challenging task of fighting for freedom, Sarnoff remains an optimist. Democracy? There is in general no more stalwart champion of democratic institutions than Sarnoff who, besides extolling democracy in hundreds of speeches, has shown himself to be one of the greatest citizens of America in practice. One of his abiding contributions to the survival of democratic law and democratic traditions in the world has been his powerful campaign against communism. The history of this period will record that Sarnoff has been America's most effective campaigner against communism of any of our leaders. Thus, his scientific contributions have brought men everywhere closer in mind and spirit, and he has repeatedly proved his devotion to the ideal of the Brotherhood of man under the Fatherhood of God.

Sarnoff has an unquenchable optimism and confidence in the underlying goodness of humanity. No one has a deeper conviction than he that our nation of free citizens is one of the chief buttresses of human freedom, order, and good government—and has a supreme part to play in the future of the world. His sincere feelings and glowing words about democracy blaze out at people like a lighthouse. He has strong convictions regarding democratic aims and objectives and firm faith that the right way will ultimately prevail. And so he is deeply and irrevocably committed to peace and freedom. And he never tires of preaching to the American public the necessity of moving with the times and adapting our minds and ideas to changing circumstances. And it is that basic approach which gives content to his ideas and brings out the values for which he stands. Further, it becomes the motivation for his larger creative efforts. In every act of Sarnoff's, one constantly notices a deep concern for the American people. He dedicates himself to their betterment with a devotion which has few parallels in history. Some call his approach "Sarnoffian Humanism." Intrinsically, it is reflected in his broad and deep sympathy for his fellow men, in his keen sense of justice, and in his sincerity in public life.

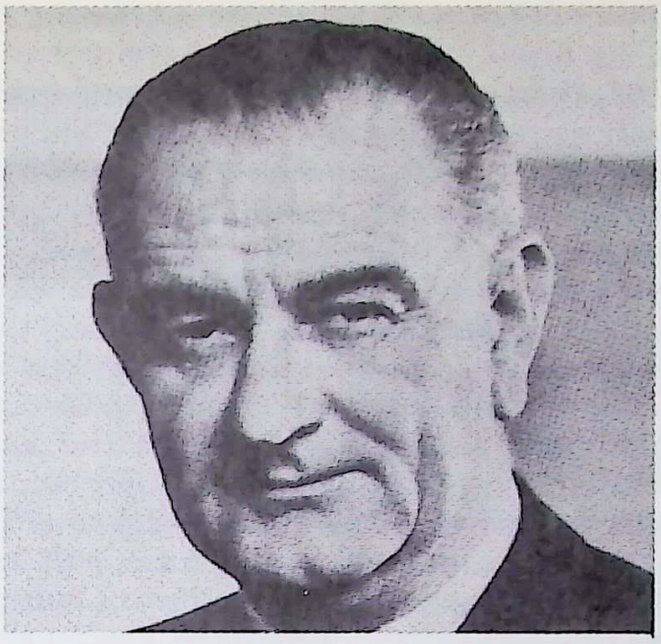
A historian has said that "often do the spirits of great events stride on before the events, and in today already walks tomorrow." Never before was this insight truer or more meaningful than it is today, according to Sarnoff. "The tomorrows ahead of us," he predicts, "will be crowded with great challenges and great opportunity. They will be crowded, too, with great dangers. More than ever in the past," he explains, "man will be called upon to discipline himself and the world he lives in, and remain true to ideals of human welfare and moral integrity. Already the human race has at its disposal the power to destroy in a moment what it would take many years to rebuild. And the precious lives that would be extinguished could never be rebuilt. Wisdom and courage of the highest order are called for to guide this new-found power into constructive rather than destructive channels. And those of us who have had a role in

*United States Senator Javits (left), General Sarnoff and President Johnson. Both Johnson and Javits are eminent recipients of the Wisdom Award of Honor.*

He is a Cellini of a man, a merchant prince, a prince of science and, beyond everything else, a great and distinguished American who knows how to construct and to live a life. The name of David Sarnoff is so intertwined with the history and development of electronics that it is synonymous with it. I predict that the ambition of many young men will be to grow up and become a "Sarnoff," for General Sarnoff is a leader, an expert, an adventurer in the world of communications. He has always been a man of vision—one who spoke in cosmic terms before we even dared to think of interplanetary travel. And he has something of the musician about him, for he has played magnificently on the instruments of his talents to produce a remarkable life which is as great an art as producing a symphony.

JACOB K. JAVITS
*United States Senator of New York*

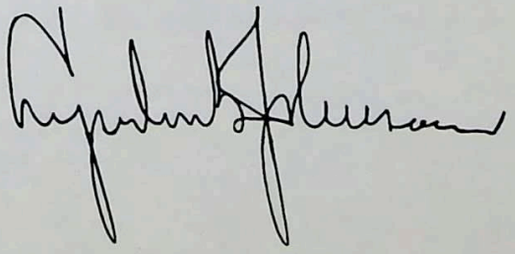
*President Lyndon B. Johnson (extreme right) and members of the United States Senate presented General Sarnoff with an illuminated scroll "in Commemoration of his 55th Anniversary of Dedicated Service and Outstanding Contributions to the Advancement of Communications and Electronics in the United States," at a Testimonial Senate Luncheon in 1961, at the New Senate Office Building. (Johnson was then the Vice-President.) Other members of the Senate shown above are (left to right): Senators George D. Aiken of Vermont, Warren G. Magnuson of Washington, Jacob K. Javits of New York, John O. Pastore of Rhode Island and Kenneth B. Keating of New York.*



It has been said that the greatest use of a lifetime is to spend it on something that outlasts it. By that standard, my old and dear friend, General David Sarnoff, has already more than earned the many awards and honors that have been presented to him. Few people have contributed more to our beloved America. He is responsible for major expansions on the horizon of knowledge. He has brought the benefits of science and technology to all people. He has devoted himself with a singleness of purpose to the advancement of scientific thought and the advancement of scientific talent to national problems.

No one better illustrates the genius of America. His life, from immigrant boy to industrial statesman, is an inspiring record. His work has not only expanded human knowledge but has contributed to the well-being, the security and the prosperity of all his fellow Americans. General Sarnoff belongs to that great group of Americans who are always on call when their Government needs them. He has always been willing to set aside his personal affairs, however important, when his services can advance his country's welfare. His corporation, RCA, is a key element in our defense structure. He has served as adviser to Presidents. His industrial leadership has been a major factor in making our peacetime living easier through the science of electronics.

We have been friends for many years and as far as I am concerned that friendship is based not only on personal affection but on deep respect. I can think of no man who has done more for the advancement of radio, television and electronics, and I am one of his strongest and most unswerving admirers. His monumental work and great achievements, which have had a far-reaching effect upon the course of our lives, deserve the attention of all Americans.



LYNDON B. JOHNSON
*President of the United States*

generating that awesome power have also an obligation to do our utmost to make it a beneficent force."

Today, General David Sarnoff can look back upon a great life of struggle, fulfillment, responsibility, achievement, vision and honor. He is one of the greatest men of this century. Nobody knows more than he that the tasks ahead are just as formidable as any he has had to face. But he faces them now with a wealth of experience and wisdom perhaps unique in American history. Having heard his speeches and having been inspired by his full life, many American men and women feel certain that our country will gather from his leadership in the years to come as much passion for decency, justice, freedom, peace and humanity as it did in the years behind. With bold and imaginative leadership, Sarnoff has contributed greatly to American education by raising the intellectual horizon of the American people in the belief that in education of people lies the ultimate hope for each nation and for a just and lasting peace among nations. With an unquenchable vitality, he has served the cause of human progress by marshaling dynamic ideas to strengthen human freedom, human decency, human rights, and the human mind.

Because Americans are mindful of his lifelong history of accomplishment in many areas of human endeavor, David Sarnoff is no longer an individual. He ceased to be so years ago. He is an institution, ever growing, ever evolving, affecting in the process the whole course of events in the vast corporation over which he presides, and influencing the lives of countless millions of his fellow countrymen. Sarnoff's approach to public activities is a continuous process of action and reaction. Sometimes it is so fast-moving that he alone can keep pace with it. He both gives and takes from people and thus formulates his plans and policies. In the nature of things his approach at no time can be static. It must always be dynamic. In fact, this dynamism drives him into situations which have no historical parallels or precedents. His emphasis is always on the eternal truths. His prime concern is to strengthen the spiritual foundations of our personal and national life, for he is convinced that man's true development and progress must be based on the principles of universal morality. His actions are essentially the outcome of his dynamic thinking, for Sarnoff's mind is constantly at work. The changes, the modifications and even the shifts in his ideas and policies are the result of his thinking aloud. Thus, no man in American business and industry can be compared to Sarnoff in the wide range of his interests, the magnitude of his achievements and the number of roles he has played with distinction. He has attained universal recognition and is respected and admired by men and women throughout the free world for what he is and what he stands for.

America can be proud of having such an outstanding citizen, who, through his efforts and far-sightedness, is paving the way towards a better future for mankind. And who, through his untiring activity in the struggle for peace and the strengthening of peaceful international cooperation, has become one of the most outstanding men of the contemporary world. Sarnoff's life sums up seventy-seven years of our country as no other American life does. He is truly an inspiring symbol of American initiative—a magnificently talented man who found in our land the opportunity for free and full expression of his genius—a fabulous figure on the small stage of the modern world. He stands alone, pre-eminent among the great men of his age and high among all the giants of world

history. It is difficult, indeed, to find an historical parallel to the many-sided career of David Sarnoff. The contributions which he has made to man's understanding of the world are beyond assessment in our day. Only future generations will be competent to grasp their full significance.

Time works its inexorable will, and men who walked the earth in their day are frequently forgotten as the long years pass. But David Sarnoff, it may be confidently said, will never be forgotten. He will be remembered beyond all other things as a man whose whole life had been dedicated to the enrichment of mankind, who rallied the forces of freedom when it was confronted by evil—a man of courage, tenacity, vision, of indomitable purpose, the power of decision, the force of personal example, and a spirit of unbreakable resolve. In the fullness of time historians of the future will analyze and dissect all the events of his long life, the vigor of his intellect, the freshness of his outlook, the radiance of his youth, and all the qualities that went into the making of his great achievements for the cultural heritage of the world. And they will know him to be a man in whom the love of country burned with a mighty flame.

All in all, here is a great man the like of whom treads this earth but rarely. Counted by all who know him as the most fortunate of men, he was born and has lived in a critical period in American history, and he has played his part nobly and well. Thus, when history is written, David Sarnoff's lasting contributions to our nation's progress in both peace and war will gleam and glow. And his life, which exemplifies the highest tradition of our country, will be a source of inspiration to all the world—especially for the youth of future generations yet unborn. His name will ring through the ages as one of the great benefactors of mankind, for Americans shall always owe him an immeasurable debt of gratitude for his achievements, and will never cease to be grateful to him for his leadership and for his enrichment of the human spirit. This is the highest tribute that America and the world can pay to a Great Man of Wisdom.

*David Sarnoff receives the Wisdom Award of Honor for "Significant Contributions to Knowledge and Distinguished Service to Education" from Leon Gutterman, Founder and President of The Wisdom Society, and Editor and Publisher of Wisdom Magazine, Wisdom Books and the Wisdom Encylopedia.*

# THE WISDOM OF SARNOFF ON *Education*

I think of education in terms of knowledge and not necessarily wisdom. It is vital and important and should be spread as far as possible. It is the hope of the world. World understanding and peace are to a large extent dependent on having an informed world, which is only achieved through education.

It is necessary for the schools to stimulate in our youth a sense of high adventure in pushing forward the horizons of science, research and invention. Boys and girls must be helped to feel the thrill of delving into the mysteries of science, and be made aware of the wonderful worlds to be opened up for the good of all mankind. But if we are to inspire more of our able and imaginative students to follow scientific disciplines, we need better teachers and wider use of the latest teaching aids.

We are faced with a shortage of qualified teachers, especially in physics, chemistry and mathematics. The fact that teachers are underpaid, that many of them can do better in private industry, is an important point that needs to be remedied. But this cannot be accomplished overnight.

Several years ago I suggested the establishment of a National Educational Reserve made up of qualified teachers of mathematics and the sciences, to be drawn from the ranks of industry. I proposed that industrial concerns release—with full pay for at least one year—a reasonable number of men and women for teaching assignments in nearby high schools. It is obviously impractical for any one company, or even a small group of companies, to carry out this plan. If it is to realize its full potential, it must have national sponsorship and a large number of companies behind it. It must also have the backing of state education authorities who would have to certify members of this Reserve to teach in their schools.

We are only beginning to realize that all of the great advances to date have been more in the nature of a reconnaissance across an unexplored frontier than a penetration in depth. We have barely begun to probe the distant reaches of the universe. Nuclear physics has given us tantalizing glimpses into the infinitesimal world of the atom and the electron. We are probing the mysteries of the creative process in the living cell. Science is learning how to manipulate molecular particles almost at will to produce new materials, synthetics, plastics, drugs. The awesome energies of the sun and stars are being brought within our reach. There is scarcely a source of physical power, organic or inorganic matter, that is not within the ultimate possibility of man's control. To capitalize on these vast opportunities, however, more education than ever before will be required. The pursuit of even one branch of science frequently requires a lifetime of application, and no man is ever the complete master of his subject.

The significant advances in technology today reflect a great variety of

specialized scientific and technical skills. The men who are contributing most importantly to progress are those with a comprehensive basic training in physics, mathematics, chemistry and related fields, and with specialized training in one or more of these areas.

An amazing world awaits us just over the horizon—a world that is challenging, exciting, promising. But it is one that can be met and dealt with successfully only by developing the best intellectual, artistic, and spiritual forces within us.

My personal destiny has placed me in the field of communications and electronics. This has given me a revealing vantage point from which to observe the shape of things to come. We all take progress for granted by this time. But we do not all recognize that in our time its character is in some essentials different from progress in past generations.

Developments that once would have required many years are nowadays compressed into a few months. For example, it took half a century to advance from clumsy mechanical office machines to modern computers. But it took less than ten years to increase the speed of these computers a thousandfold.

The ever accelerating tempo of progress is dramatically reflected in the story of flying. It took forty years—from the Wright Brothers to World War II—to push flying speeds close to five hundred miles an hour. But it took less than fifteen years to go from five hundred miles to the eighteen thousand miles an hour at which man-made satellites are circling the globe right now. And specialists in aeronautics tell us that is but the beginning.

The constantly quickening pace of scientific and technological development means that we live in a time of rapid obsolescence. This day's wonder will be "old hat" tomorrow. No year, no month almost, is without its startling innovations. The danger, as I see it, is that the habit of endless change may be carried over into departments of life that rest on principles which are changeless. And it is precisely this danger that men and their institutions of education must consciously guard against.

Our advancing technology impinges not on just a few selected areas but on virtually every form of human endeavor. This many-sided impact, this thrust of dramatic change in all directions, will grow ever stronger and wider. Progress will encompass not only the earth but the infinite spaces around it—first other planets and then other solar systems.

Education must include not alone knowledge, for knowledge without wisdom can create a great menace. We must be wise in the use of new

tools and new instruments if we are to avoid catastrophe for mankind.

I have every hope that those who have responsibility for training the young will recognize that there is room in any educational curriculum for the humanities, as well as for the scientific specialties. There is room for knowledge about history, about philosophy, about religion, about the moral concepts upon which this world has developed in the past, and upon which it must continue to develop if we are to preserve all that we hold dear. We must continue to emphasize these things if we are to safeguard our way of life, our dedication to freedom, our recognition above all, that the state is for the service of the individual, and not the individual for the service of the state.

In industry, the progress of automation will free man at work from drab routines and give him ever broader scope for the exercise of his higher skills—and ever greater leisure for the development of artistic, cultural and spiritual interests. In medicine, the new tools of electronics and atomics will bring an avalanche of improvements in diagnosis and treatment. Already the electron plays a vital role in surgery, medical research, and other aspects of healing. Within our own lifetimes, man's span of life will be brought close to the century mark. Thus, the sum total of God's greatest gift—life itself—will be vastly multiplied.

The decades ahead hold out an intensified challenge of progress. By this I mean that it will be more and more difficult to digest the clamoring and infinitely diverse new world. The changes will be too swift and multitudinous to be fitted into accustomed ways, as changes used to be accommodated in the past. They will compel far-reaching adjustments right down the line. The progress of science and technology will make our economic and social organizations ever more complex, requiring ever higher levels of training, competence, and, above all, understanding. Mind power is replacing man power as mankind's decisive resource.

Not only must we learn to use the immense powers of technology efficiently, but what is more important, we must learn to use them to good purpose. Technology, by itself, is neither good nor evil. It can eliminate, with equal efficiency, polio or people. It opens up exhilarating vistas of higher living standards, a more satisfying life for all mankind. But these vistas are shadowed by peril, because man will have in his hands terrifying forces of destruction before he has learned to control and to utilize them beneficently.

The overriding need is for men and women equipped by education to cope with the grave challenge of crowding progress. Unless that need is filled, so-called "progress" can turn into its very opposite—retrogression. How well does modern education measure up to this stern challenge? All of us have occasion to ask ourselves this question. Education in our age has ceased to be the concern of specialists alone. It is everyone's concern.

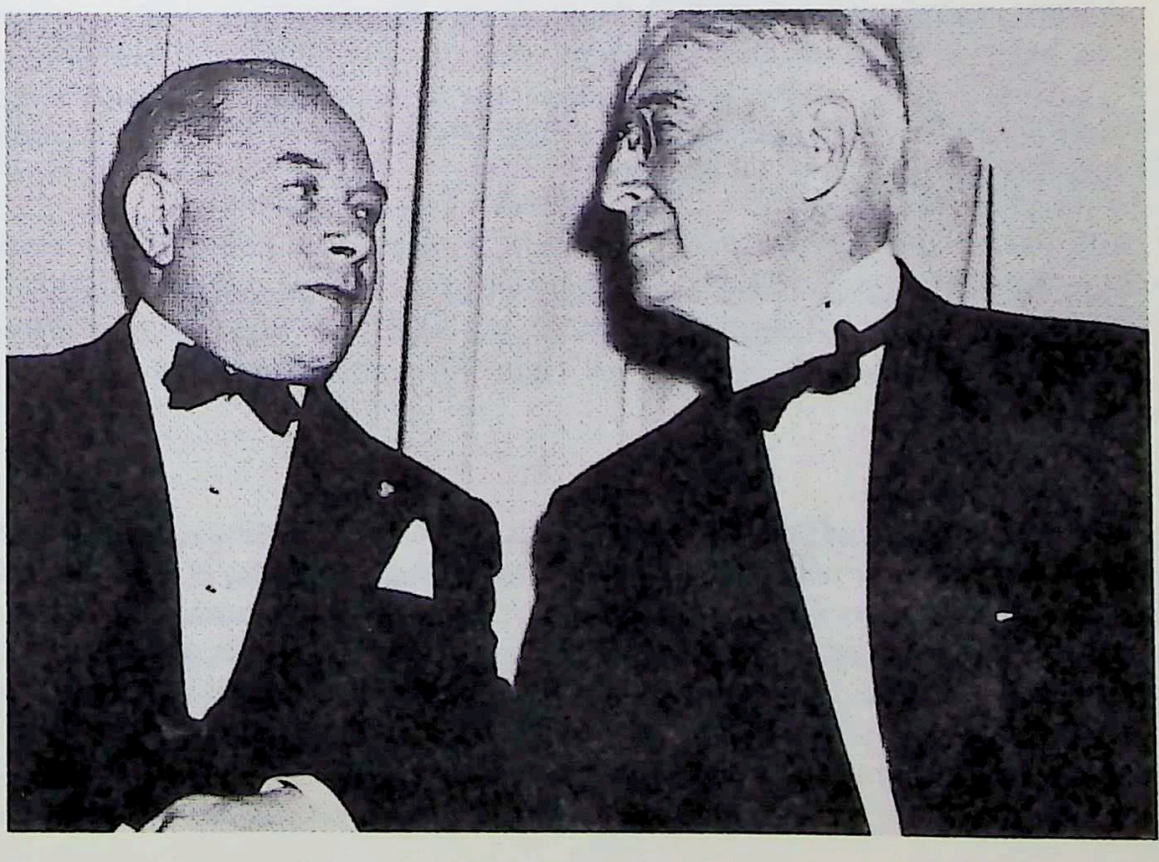
In a long and rather active life, especially in the troublous times through which we have passed and are now passing, one meets many men of all races and creeds, and all nationalities, and in various arenas of life and activities—political, military, scientific, in war and in peace. And out of all of these men and women we select, naturally, some of those we consider the best. I have always felt privileged to select David Sarnoff as one of those men whom I wished to cultivate on account of many qualities, particularly his vision.

He is a practical engineer; he is a practical scientist with all the knowledge of modern electronics and the splitting of the atom; he is what I call an industrial statesman. I say that because it is evidenced in what he did in the work particularly in which he is engaged in the corporation which he runs. He thinks not only of the interests of his stockholders but the interests of his workers and the interests of the public and, above all, the interests of his country.

If, in my experience, I was asked to suggest a small group of men because of their experience, their wisdom, to guide this country in war or in peace on any crisis, David Sarnoff's namé would be high on any list no matter how small it would be. So, when you think of David Sarnoff, you have to think of him in terms of bigness—of bigness in mind, in spirit, in courage, and in his devotion to his country.

Bernard M. Baruch

BERNARD M. BARUCH
*Philanthropist, Financier and Educator*



*For many years, Sarnoff enjoyed the personal friendship of men such as Bernard Baruch, who said of him that he had the gift of imagination and the ability to make his dreams come true.*

I do not believe that the current problems in education can be solved in terms of quantity alone—by merely doing more of what we have been doing. This comforting notion, offering relatively easy solutions, doesn't stand up under examination. The sheer arithmetic of it is staggering. Viable solutions obviously must be sought and found to meet this alarming problem. The clear objective must be to reduce the per pupil cost of teaching and to provide fair compensation for underpaid teachers while expanding facilities and improving the quality of education. I recognize that this is no simple task. But the time has come to think in terms of new approaches, new patterns, and new concepts which would make it possible to achieve all these objectives.

Through the decades, we have shown a remarkable talent for innovation. Why should not the same talent be brought to bear on the education of our youth? The possibilities are almost limitless, provided we tackle the challenge of education as daringly and as imaginatively as we do other aspects of our national life. Electronics, for example, has pioneered many pedagogical innovations. One is the magnetic tape that is the core of our new language laboratories. Through the use of recording and playback equipment, a teacher can instruct as many as three classes at the same time. By flicking a switch on his master control panel, he can listen to the recitation of a pupil seated in a private study booth. The teacher can correct errors and offer helpful suggestions as the pupil concentrates on a prerecorded lesson geared to his level of learning. When he has a question, the pupil is able to talk directly with the teacher on his "intercom" without disturbing the rest of the class.

In addition to its use in modern languages, magnetic tape is now being used to teach a wide variety of other subjects, especially in the elementary grades. Experiments have turned up heartening evidence that it can contribute significantly to improving education both in quantity and quality.

Educational television is bringing new vitality to teaching in hundreds of schools. Millions of students are getting at least part of their formal instruction through television. And that, of course, is no more than a small beginning.

More than three hundred colleges and universities have given academic credit for physics and chemistry courses being presented on NBC's "Continental Classroom." These courses point up dramatically the way in which television can extend the influence of the most talented teachers. On a coast-to-coast hookup, one outstanding chemistry professor may teach as many students as would require two thousand teachers under the ordinary classroom pattern.

The day will come, I feel sure, when there will be a nation-wide television network devoted exclusively to education. The basis for it already

exists in the noncommercial educational stations now in operation. That nation-wide television courses are practical has been convincingly proved by "Continental Classroom," although much remains to be done to expand and sharpen their effectiveness. When this technique, so natural to our times, is in wide use, classrooms of one hundred thousand or more under one gifted instructor will become a matter of course. The ablest teachers will be better paid, and they will do a better job for more pupils in less time and at less cost than ever in the past. Eventually, it may be possible for those who, for one reason or another, cannot enter college to earn a college degree in their own homes. Without doubt other techniques—some of them combining the best features of new and conventional methods—will be developed, once the inertia of habit is overcome and the new approaches gain popular acceptance.

I do not believe that we must imitate the Soviet Union in their fanatical emphasis on technology—by downgrading or even excluding the humanities. In the Soviet ideology, man is not an end in himself but only a tool of society. That dehumanized concept is reflected in their schools. The totalitarian state is not concerned with what its citizen is, but only with what he can do. Theirs is a materialism carried to the extreme.

In the Soviet Union today, science and technology and vocational training get top priority—at the expense of broader cultural and humanistic studies. It is, indeed, more of a mobilization than an educational process. Some Americans, however, are demanding that we imitate Russia. They do not grasp that, short of adopting the totalitarian view of life, we could not do this in any case. If we attempt to do it notwithstanding, we will inevitably come closer to the totalitarian society ourselves.

No one denies that the tasks of our technological age require more scientists, engineers, and other technical specialists. Our educational institutions must be geared to meet these demands. Since World War II, while technology was advancing in seven-league boots, our education has not kept proper pace. Some high schools even dropped chemistry and physics, although these subjects were revolutionizing everyday life. They minimized mathematics, although its rigorous disciplines dominate our industrial and economic scene.

Our schooling must take cognizance of reality by placing more stress on mathematics, chemistry, physics, and economics, if our youth is to be at home in the world of tomorrow. But overspecialization here would be as harmful as it has proved in other areas throughout history. Dante tells us that overspecialization caused the failure to complete the Tower of Babel. Each group worked on its particular job, developing its special jargon until, after a while, one group was unable to communicate with another. The result was a Babel of voices.

Because the role of science in all departments of life has become so

great, it seems to me vital that leaders in government and in the military, as well as leaders in commerce and industry, should have at least an understanding of the fundamental principles of science. Such an understanding is indispensable nowadays in making essential decisions and in charting courses for the future. Without this common understanding, our society risks becoming a modern Babel. Having acknowledged this, we still have an obligation to keep abreast of the humanities. What is called for is a rational balance of disciplines—not a blind imitation of the Russians, but an open-eyed adjustment to our own needs in the light of our own values.

A many-sided humanism has been the hallmark of education in our free society. It provides the very foundation of our way of life. Cardinal Newman defined the good education as one that "brings the mind into form." Ours has aimed, rightly, to develop "the whole man" rather than the robot with bulging technological muscles envisioned by Soviet education. Today, education must provide a prominent place for the physical sciences. But it must also embrace a study of history to illuminate the past, a study of literature and philosophy, the creative arts, and the science of thinking.

Each generation's specialized skills and techniques are soon outmoded, but the search for wisdom is never ending. All of man's material triumphs cannot quench his thirst for that larger wisdom which compasses beauty and justice, insight and understanding, virtue and love. Let us not blunt or despise that craving, for it is the chief source of our real strength.

In the swiftly changing world of the twentieth century, no one can foresee what future problems will have to be resolved. But this we know: Whatever they may be, they will call for qualities of intelligence, resourcefulness, and judgment. Our best hope, therefore, lies in the well trained mind and the well rounded personality, and these, it seems to me, are the rightful goals of our education. It is not enough to be capable of defending our civilization against the new barbarians. We must maintain a civilization worthy of defense—one to live for and, if necessary, die for.

I do not believe that the education of modern youth can dispense with spiritual training. Abraham Lincoln once said, "Education is not given for the purpose of earning a living; it is learning what to do with the living, after you earn it, that counts." His words are, if anything, more pertinent today than in his time—if only because they are less heeded.

Education worthy of its name is not merely an intellectual process. It is no less a spiritual process. Its purpose is not only to pile up knowledge and skills but to ennoble man's soul. Rarely in the past has there been such urgent need for the kind of insight and understanding that we call spiritual.

The dilemma of our time—the historic contest between communism and freedom—is usually posed only in economic, scientific, and military terms. Yet its challenge is first of all moral. Let us have no doubts about it. Man's soul is deeply involved in the equation of our times.

We know from recent history that science and technology, if cut loose from ethical standards, can become monstrosities. We have seen the hideous Nazi medical experiments which, in the name of science, used human beings as guinea pigs. We have seen the ruthless communist "liquidation" of entire classes of the population in the name of "scientific" Marxism. Such grim exhibits stand as eternal warnings in a time when more and more material power is being gathered into mortal hands.

The central fact of the crisis of our historic period is moral. Its political and economic manifestations are less cause than effect. The cause, and I am referring to trends throughout the world, is in the weakening of moral imperatives, in the degradation of man to a thing, shorn of the intrinsic values that make him a child of God. The irreducible truth that man is a spiritual entity has been attested by the total experience of mankind as expressed by its seers and saints through the ages. Our education of the young must acknowledge the spirit of man. It must inculcate respect for the accumulated spiritual wisdom of the human race. It must present a consistent view of the good life—part of which is the duty and the courage to defend it.

We may differ as to the best means of imparting moral training. The relative roles of home and school and church are open to discussion. But the basic need, it seems to me, is indisputable—even in the most elementary terms of national survival. Maintaining a military lead over the communist world—and maintain it we must, of course—will not suffice if our moral resources are depleted. It is when we blur the dividing line between good and evil that the enemy acquires telltale advantage.

I believe we must recognize that the current crisis in education calls for new approaches to the problem. We must seek to discover and devise new teaching patterns and techniques that take full advantage of technical advances. I believe that while giving adequate attention to the sciences in our curricula, we must not neglect to teach the humanities that have formed the very basis of our free society. And I believe that the true purpose of education is not only to fill man's mind with knowledge and his belly with food, but to deepen his spiritual insights.

Education will be emptied of meaning unless we are able to meet the challenge of change. I know that it is not easy. But this self-deluding search for what is "easy" is in itself a symptom of what ails modern man. It is one of the things that a valid education should strive to counteract. And this can be done only by teaching the age-old values of character, discipline, sacrifice, and morality.

I am happy to see the degree to which many educators recognize the opportunity which television offers them. The action of the Board of Regents of New York State in petitioning the Federal Communications Commission for channels for an eleven-station television network across the Empire State, is significant. In this plan the Board of Regents sees a means "to reach and make more uniform the standards of education in the state by extending to all scattered rural communities in it the educational cultural benefits now available only in the most populous metropolitan areas." Colleges, universities, medical schools, museums and libraries are television "classrooms."

In preserving America's heritage of freedom, and in extending its benefits to less privileged peoples elsewhere, our colleges and universities have always played a major role. The mission of a university has been described as "to discover the truth, to impart the truth and to disseminate the truth," hence our three-fold function of research, resident instruction and extension. In other words, its stock in trade is the truth. As a public institution, supported by state and federal funds, it is its business to search for and discover new truths hitherto hidden from the mind of man; secondly, to impart the truth, both old and new, to those who come to learn; and finally to disseminate the truth widely to the general public so that all may benefit.

Harvard, the oldest of our American Colleges, was founded in 1636, the same year that Roger Williams established Providence Plantations. Its well known *veritas,* "truth," set a pattern which inspired many another college to follow suit. Yale, third of the colonial colleges, adopted the motto *lux et veritas,* "light and truth." Providence College, like Harvard, marches under the banner of *veritas,* while the state universities of Indiana and of Montana have the same motto as Yale. The theme of freedom appears in the motto of the University of North Carolina — *lux et libertas,* "light and liberty." Many other colleges and universities, both public and private, have expressed in their mottoes the ideals of truth and of freedom. Pre-eminent among them all is the motto of the University of Virginia, the biblical passage — "Ye shall know the truth, and the truth shall make you free." It is the motto also of the University of Tennessee.

We have been seekers after truth. Generation after generation the human family has been searching for new knowledge, uncovering the secrets of nature in an effort to learn more about people and the world we live in. Century after century and year after year, philosophers, teachers, scientists, preachers have been penetrating the fogs of the unknown, to discover the ways of God and of man, and of God's purpose for man. Out of this effort and contributing toward its realization, have risen our colleges and universities which now play so vital a role in human life.

As a people, we are better informed today than we have ever been. The body of knowledge is larger and the means of making it known are

greater. And yet in some respects, we are still woefully ignorant.

It is not good to become the slave of habit which may grow out of ignorance or only partial knowledge. The old adage that a little knowledge is a dangerous thing goes both for nations and for individuals.

We must face up manfully to the communist challenge on every front, and this most certainly includes the vital field of education. Rarely has this nation been as deeply conscious of the problems of education as it is today. I wish we could pretend that this new interest reflects a sudden love of learning. But we know that it was touched off by fear—the fear inspired by the growing technical competence of Soviet Russia.

It is both ironical and disturbing that we Americans should have been alerted to the new importance of education by a brutal totalitarian state. We have always equated education with freedom, specifically freedom of the mind. Could we be outstripped in the classroom by a society which outlaws the free intellect and creative audacity, by a society rooted in irrational dogma and buttressed by censorships, thought controls and murderous terror?

We have rested our educational faith on the Biblical injunction: "Ye shall know the truth and the truth shall make you free." But in Soviet Russia only a carefully restricted segment of the truth is being explored and exploited—and not to make men free but the more to enslave them. Has our faith then been misplaced? Shall we allow ourselves to be intimidated into accepting the enemy's limitations on truth? Of course the answer is no. On sober consideration our traditional equation of education and truth appears to be not only valid but more significant today than ever in the past.

We should try to understand the nature of education in a totalitarian state, in order that we may not rush blindly into aping it. And even a cursory examination of Soviet educational policy and purposes gives us the right to doubt whether what passes for education in Soviet Russia —and now in Red China as well—is worthy of that proud name.

The unlimited dedication to science and technology repeatedly advertised by Russian leaders is just one more aspect of their fanatic commitment to purely material and power goals. It has precious little to do with what mankind for millenia has regarded as education. The Soviet hierarchs hardly bother to conceal their contempt for all the ethical and aesthetic, liberal and spiritual values woven into our educational philosophy.

Soviet schooling is not concerned with the happiness and preferences

and creative drives of the individual man or woman, but solely with fortifying the might of a faceless state. "Its aim," it has been well said, "is not to produce whole men, balanced personalities for life in a normal society, but half-men with bulging scientific muscles for life in its own abnormal environment."

Certainly we must provide ever larger, more competent contingents of specialists for the tasks of this technological age. I have myself offered proposals, at various times, for stimulating science studies and expanding the pools of trained technical personnel so vitally needed to meet the requirements of our national defense. Even if the Soviets did not exist, we would still have to meet the burgeoning man power demands of industry, research, communications, weapons. The Soviet accomplishments along these lines have simply dramatized this need and made it more imperative.

We would be killing the goose that laid the golden eggs of our civilization if, in the preoccupation with material progress and power, our institutions of learning retreated from humanism and all it connotes. The problem, I sometimes suspect, is at least in part semantic. One wishes, that is to say, that there were another word to distinguish education in the older and deeper sense from education that is essentially vocational and utilitarian. We can admit the compelling need for more and better plumbers—the plumbers of electronics, nuclear power, space exploration and the rest—without reducing all human existence to plumbing.

The greatest truths, those of prophecy and poetry, cannot be "proved" in laboratories. They cannot be analyzed or appraised by electronic computers. Yet those are, in the last analysis, the truths we live by. While maintaining leadership in science and technology, therefore, we should not yield an inch in our respect for the free society we mean to defend, and the many-sided humanistic education that has always been and remains its hallmark. This view was once expressed, with his usual felicity, by Sir Winston Churchill. He said: "Our inheritance of well-founded, slowly conceived codes of honor, morals and manners, the passionate convictions which so many millions share together of the principles of freedom and justice, are far more precious to us than anything which scientific discoveries could bestow."

It is true that our schools must place more emphasis on mathematics, chemistry, physics and other such disciplines, but it is no less true that our technical and engineering schools must allot more space in their curricula to the humanities. Most of them, in fact, have begun to do so in recent years.

Our education cannot, except to the peril of all that we most cherish, be diverted exclusively to the mass production of engineers and tech-

nicians. It must remain loyal to ideas and ideals which are transcendent and universal; which have served the human race through the centuries and millenia despite constant material and social change. But not until our own time, I think, has the validity of those ideas and ideals been subjected to tests of change as profound, as swift, as fundamental as those now being made.

Our generation has been chosen by destiny for great decisions. More than ever before, therefore, we require robust intellectual and spiritual leadership. To ignore the pressing changes would be to accept disaster by default. A keen and continuing awareness of their reality seems to me essential.

In discussing education a few years ago, Dr. Arthur H. Compton said: "Science is forcing man to make decisions that will either ruin him or educate him to greatness." But science — by itself — cannot make those decisions. They must be drawn from the ethical and aesthetic wisdom of the race of men — the wisdom enshrined in religion and art and institutions of justice.

Our fate will not be decided by material prowess alone — important as that is for our mere physical survival. Ideas and ideals, the hunger for human dignity and self-expression, will weigh heavily in the scales. If our supremacy in technology has been opened to doubt, our supremacy in these elements of the human spirit is still beyond question. Let us not relinquish that advantage.

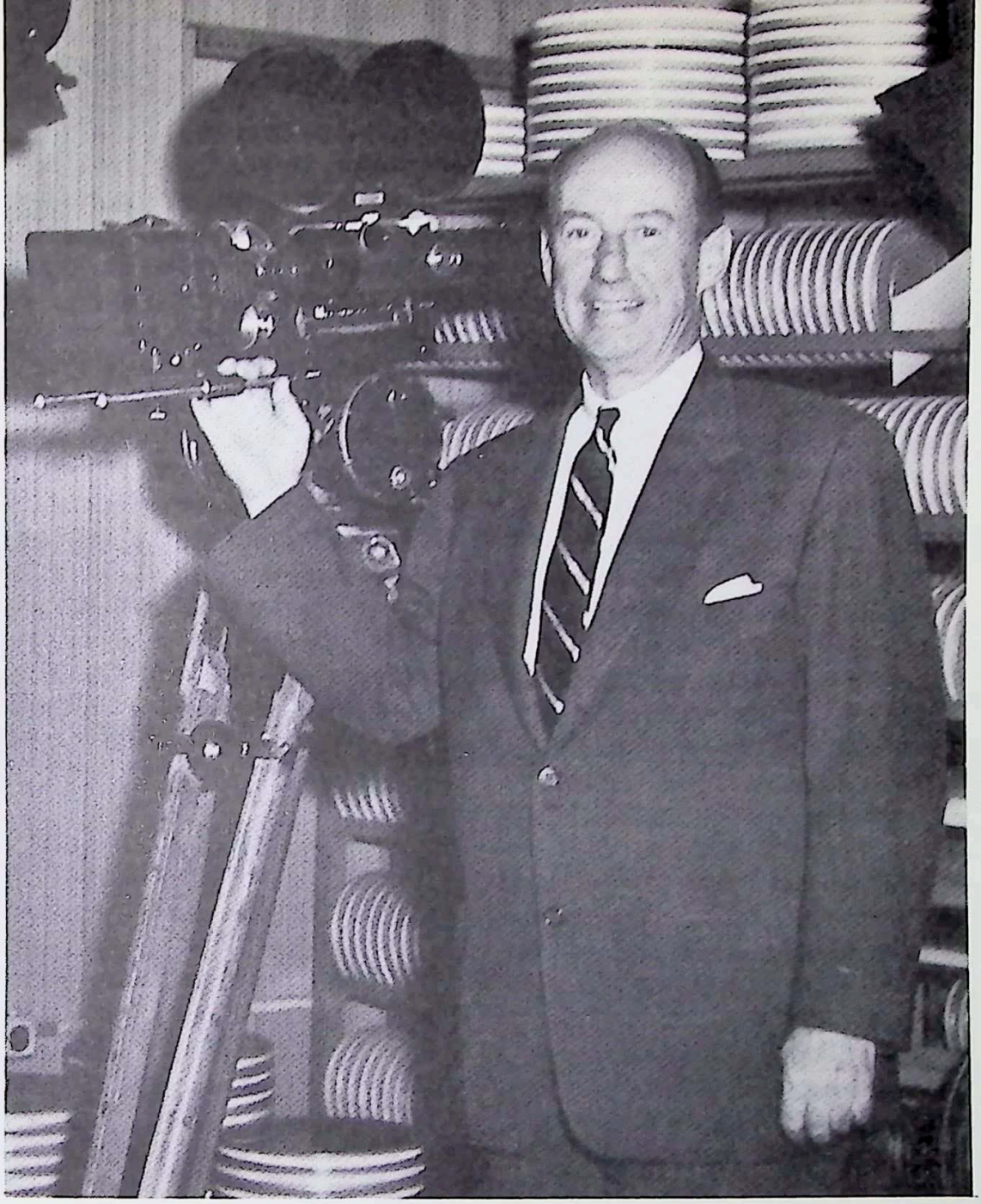
Science provides tools and opportunities, but it has no built-in vetoes on the purposes for which they will be used. Thus its every achievement is also a test of our permanent values. Our rapid conquest of outer space will be an empty victory if it leads to neglect of inner space — of man himself, his gifts of contemplation, his passion for freedom and justice, and his hunger for salvation.

The name of Boris Pasternak, a Russian-Jewish poet, was very much in the news some years ago. He seemed to have given the Kremlin leaders a case of jitters because he wrote a novel — which they, of course, suppressed — placing man above the state, love above class struggle, virtue above political dogma. In an interview with a Swedish professor shortly before he was awarded, and then forced to reject, the Nobel Prize for literature, Pasternak had this to say, among other things: "In this era of world wars, in this atomic age, the values have changed. We have learned that we are the guests of existence, travelers between two stations. We must discover security within ourselves. During our short span of life we must find our own insights into our relationship with the existence in which we participate so briefly. Otherwise, we cannot live! "This means," he said, "a departure from the materialistic view of the nineteenth century. It means a reawakening of the spiritual world, of

our manner of life, of religion. I don't mean religion as a dogma or as a church, but as a vital feeling." These are the ideas for which Pasternak was degraded in his homeland and became famous abroad. His eloquent words have a special dimension of power precisely because they derive from the poet's experience in a time and a country fanatically committed to materialism. They prove, we must hope, that the love of righteousness is not dead, even in the hearts of the Kremlin's long-suffering subjects.

Knowledge is not enough unless it leads you to understanding, and, in turn, to wisdom. And wisdom implies an appreciation of the basic laws of nature and of man's behavior. It calls for patience to select or develop the best means to achieve the best possible results. In this deeper and truer sense education is a never ending process, drawing its sustenance from both work and play, and nurtured by love, sympathy, aspiration to brotherhood.

*Bernard M. Baruch (left), elder statesman, humanitarian, financier, philanthropist and adviser to six presidents of the United States, is shown here discussing the first issue of Wisdom Magazine with Wisdom's Founder, Editor and Publisher, Leon Gutterman. One of the most remarkable men of our time, and one of the world's greatest authorities on the economic problems of war and peace, Baruch was honored with a special edition of Wisdom Magazine which was devoted to his wisdom and published in tribute to his distinguished achievements in the fields of both national and international affairs. An eminent recipient of the Wisdom Award of Honor, Baruch was also one of the notable Americans who encouraged the creation and publication of Wisdom.*

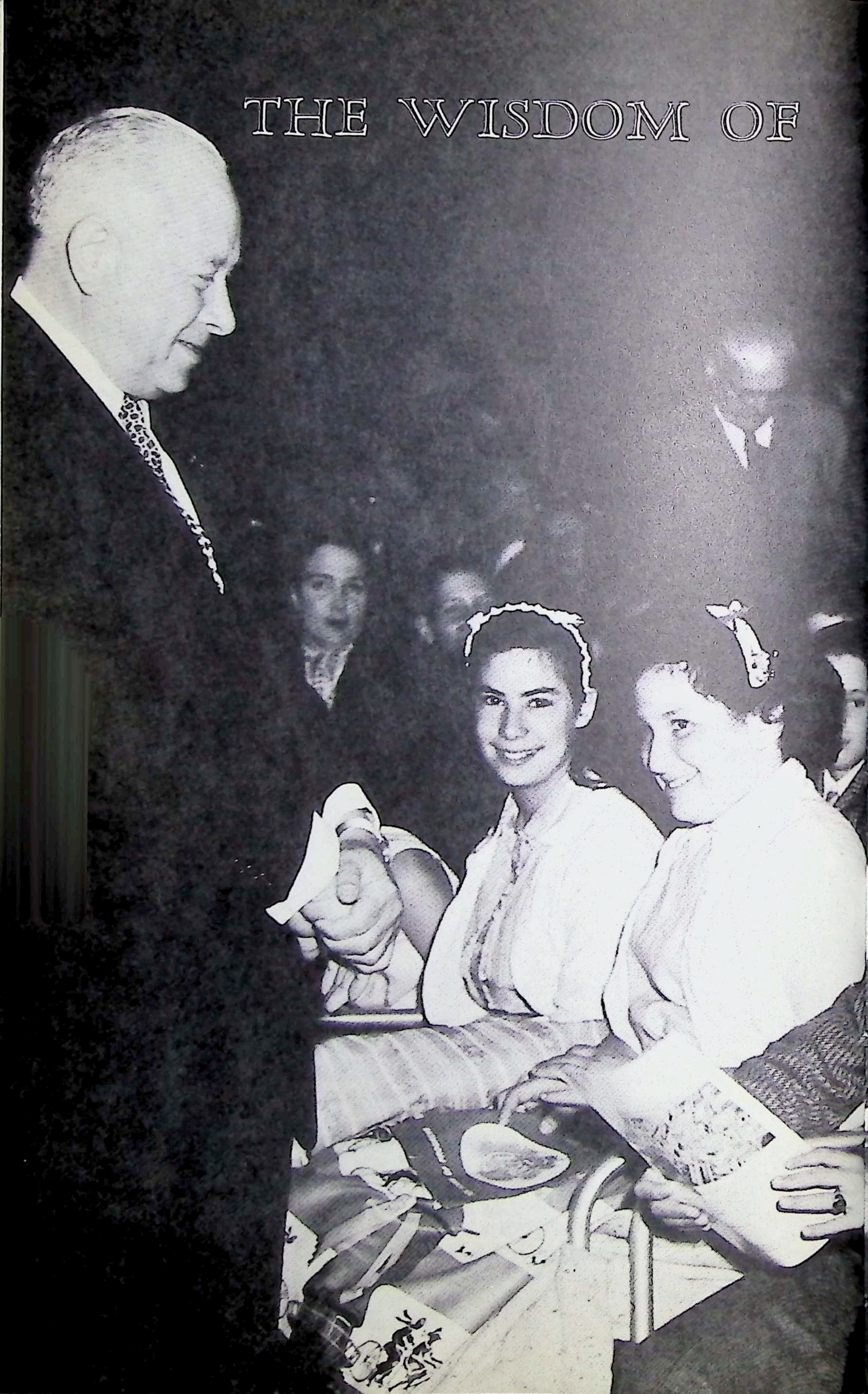


The high position of this great American, David Sarnoff, is simply the reward of accumulated merit. He has forged to the front as an industrial leader and patriotic citizen by the sheer force of his personal character. He has achieved distinction that genius may envy. His is the brilliant record of splendid talent constantly employed to the best effect in the accomplishment of the noblest ends. All his rank and power and influence have been for good—for the betterment of his fellow men, for the honor of his country, and the exaltation of God. The attention that has been accorded him throughout the nation and for so long a time, together with the fact that his fame and prestige have grown steadily with his years, is proof that his influence is intensive as well as extensive. It is given to few to enjoy so much respect and admiration and such thorough confidence in the minds and hearts of the American people. And the most genuine tribute to his value as a great man and as a distinguished leader is the fact that he is most revered and best loved by the members of his own great RCA organization. I am honored that the opportunity has come to pay tribute to what is highest and best in American citizenship.

Adlai E. Stevenson

ADLAI E. STEVENSON
*Former United States Ambassador, United Nations*

# THE WISDOM OF



# SARNOFF ON *Youth*

The world needs fresh energies, the restless and inquiring spirit of our youth, no less than the experience of our elders. The hazards of the world in which we live, including its new scientific weapons, place an unparalleled premium on intelligence. Mind power is replacing man power as our decisive resource. And the young students are the ones to whom the world looks for leadership in the scientific world of today and tomorrow.

You have heard of the Steam Age, the Electric Age, the Atomic Age, and so on. Well, of all the ages and of all the forces that history records on the development of science and technology, no period is as great or as promising as the one in which our youth have been born, the one in which you and I and the rest of us now live.

The power within a single atom is of no consequence unless that power is geared to the power of another atom and a chain reaction is created. So it can be also with a human being. The Adam, this time, instead of the atom, must be connected in some mysterious way so that the energy from one can stimulate the energy in another. We must find a way to create a human chain reaction, just as we have found a way to create an atomic chain reaction. Then we can have human power control the new technological powers that have within them the force for evil as well as the force for good.

I always say to myself, "God Bless America." Surely, I am no exception for there are many, many others in the United States who have also developed, advanced and prospered. I have tried to convey this message to the rising generation of Americans and to point out to them that in my view there are more opportunities in our country today than there were when I arrived in New York, in 1900. There are more people in the world, more wants to satisfy, and more resources and tools to employ today than there were then. No American boy or girl needs to weep with Alexander that there are no more worlds to conquer. For there are a great many worlds. But, in a larger sense, it is not the world we want to conquer—it is man himself.

Young people are today growing up in years of extraordinary change and, with it, serious dislocations in ways of living. In their own brief lifetimes, they have witnessed the tremendous surge of science and technology that is affecting nearly every facet of human existence.

Consciously or unconsciously, our youth are apprehensive about how they will fit into the unfolding technological age. The most perceptive among them miss and envy the certainties which, it seems to them, had given a larger measure of stability to preceding generations.

I have talked with a great many young people. Some of them have frankly sought advice on their careers and opportunities. Seeing the

dramatic progress of the conquest of space, they sometimes ask: "What more is left to accomplish?" As citizens of a democracy whose future depends on the calibre of its new generation, we have an obligation to reflect on that question and to provide meaningful answers. But such answers cannot be limited merely to new scientific inventions which are on the horizon. They must point to a greater degree of individual responsibility as well as a wider field of opportunity.

In our deepening concern over juvenile lawlessness, we sometimes forget the interests and problems of the wholesome, law-abiding majority of our young people. After all, there are in our country some twenty-five million boys and girls between the ages of ten and seventeen. To generalize about them in terms of the latest rash of delinquency—to penalize them by neglect because of the sins of a few—is neither fair nor useful.

It has been my good fortune to occupy a ringside seat in the arena of science and technology. In more than half a century of intimate involvement in communications and electronics, I have seen the physical world revolutionized under my very eyes. And we are only on the threshold of knowledge about the universe that will open up new opportunities for youth and for the advancement of all mankind. I refer not merely to the vast number and variety of the discoveries and inventions in our epoch. The more relevant hallmark of the epoch has been the speed with which new developments have come—the constant acceleration of the rate of scientific progress. The last sixty years have brought more technical change than the twenty centuries that went before. And at the rate we are going, the next decade is likely to see more change than the crowded six decades that preceded. Our very vocabulary of measurement has been outmoded. We are constantly compelled to improvise new words and formulas to convey magnitudes of distance, speed and power being brought within our capacities for action for the first time.

Science and technology have been revising our concepts and reshaping our world, and the dizzying process gains more and more momentum. Small wonder that man has found it hard to keep pace with this revolution—that he finds himself baffled and intimidated by the ever increasing forces at his command. This, indeed, is the tragic paradox—and by the same token the great challenge—of our time.

While extending mastery over the material world around him, man feels that he is losing mastery over himself. As Dr. Albert Schweitzer said, "Man has learned to control the forces of nature before he has learned to control himself." Unless the gap is closed, we may find ourselves the slaves rather than the masters of the incalculable powers we have summoned from the heart of nature. It is in this reality, in this threat, that one must look for answers to the question raised by young people. An immense amount of vital and rewarding work remains for them to accomplish in order to bring humanity into harmonious relation with its shifting material environment.

We have built up a staggering storehouse of knowledge about the world around us. But man himself is still shrouded in a smog of misconception and ignorance. We have learned to identify with uncanny accuracy the chemical composition of stardust millions of miles away, but still know relatively little about the composition of cancer cells in our own bodies.

Though man has understood the complexities of the atom, he has largely failed to understand his fellow man. He has learned to see and hear electronically to the outer reaches of space, yet his mind has been unable to cross the narrow boundaries of prejudice. More than ever before, therefore, we must give thought to the wisdom of the ancient Greek injunction: "Man, know thyself!" More than ever before, we must act on the truth that the proper study of man is man himself.

The time clearly has come for a penetrating study of man in all dimensions, both in the physical and metaphysical sense. We must come closer to knowledge of what makes him tick, through a concentrated study of his body, his mind, his soul. Our preoccupation with outer space must be balanced with a purposeful exploration of inner space. The time clearly has come to release creative and spiritual energies to match the physical energies being released by science.

There are worlds to be opened up and charted within ourselves, as exciting as any that we have tackled outside ourselves. Consider, on the simplest physical level, the horizons for the improvement of man's health. It was Benjamin Disraeli who once remarked that "the health of the people is really the foundation upon which all their happiness and all their powers as a state depend." I am not forgetting the progress that has been achieved in recent years. Our twentieth century has pushed back the frontiers of knowledge in diagnostics, preventive medicine and therapy. Average life expectancy has been increased from forty-nine years in 1900 to well over seventy today. Yet the medical authorities themselves are the first to concede that each advance only underscores the need for additional knowledge. Dr. James Watt, head of the National Heart Institute, stated: "We have blazed a long trail but an uncharted wilderness lies ahead." So it is obvious that gigantic areas of usefulness await the dedicated young men and young women in the domain of healing and medical research. Fortunately the other sciences are placing ever more proficient tools at their disposal for these purposes.

In the field of electronics, amazing instrumentalities for medical investigation and therapy are being perfected. Already the surgeon is able to substitute temporary electronic organs while he operates on the natural organs. It is conceivable that eventually miniaturized electronic substitutes will be developed to serve as longtime replacements for organs that have become defective through injury or age. It is not too farfetched to imagine a man's leading a normal life with one or more vital organs replaced by the refined substitutes of the future. One day artificial kidneys, lungs and even hearts may be no more remarkable than artificial teeth.

Our automobile and airplane have dashboards of gauges and meters that give the driver or pilot all the pertinent information about the operating parts and behavior. There is no technical reason why we cannot develop an equivalent "dashboard" for the human body. It will be a home device, like scales, that will register not only weight but heart beats, blood pressure, pulse rate, temperature and other basic data. Moreover, it will carry an alarm system advising the user when to consult a physician. The same device will record the daily results on magnetic tape to help the doctor in his diagnosis. I am not for a moment suggesting that electronics will ever replace the doctor. My point is simply that the triumphs of science in fields outside the body can provide instrumentalities of great accuracy to help solve problems of bodily health and longevity.

We must extend our comprehension of man as a social, intellectual and spiritual entity. And that job is even more important and more formidable than the job of learning about his physical makeup. It is only through such comprehension that we can cultivate, to the fullest extent, the human potential on which our civilization rests. The assignment is a difficult one, but replete with the kind of adventures of discovery to stir the imagination of our ablest young people.

Human motives, instincts, impulses and behavior patterns have, for the most part, eluded the analysts and statisticians. Vision is clouded by racial and religious animosities unrelated to reason. Too often a sense of purpose is lost in a hurricane of irrational passions. The possibilities for devoted labors in this area are almost limitless.

There is no more searching or difficult problem for a free people than to identify, nurture and wisely use its own talents. Indeed, on its ability to solve this problem rests, at least in part, its fate as a free people. For a free society cannot commandeer talent. It must be true to its own vision of individual liberty. And yet at a time when we face problems of desperate gravity and complexity, an undiscovered talent, a wasted skill, a misapplied ability, is a threat to the capacity of a free people to survive. Surely such problems point to frontiers of knowledge demanding, for their conquest, as much courage, imagination and zeal as any of the geographical frontiers already crossed. If made aware of this challenge, young people should have no reason to deplore any lack of worlds to conquer. The technological age, they will realize, has assigned to them the urgent tasks of finding a viable adjustment between mankind and the ever accelerated revolution in its physical environment.

No one, I am sure, will suspect a man with my background of derogating the contributions of science and technology. In infinite ways they have enriched life and reduced its burdens. Besides, scientific progress cannot be halted in its tracks, let alone reversed, even if we wished to do so. We are in the technological age. We must live in it and with it. But precisely because I have been so close to the technical revolution, I am also keenly aware that it is not without its hazards and pitfalls. As ever

more startling products and services pour from the laboratories and factories, respect for traditional values tends to be diluted. Obsolescence being the order of the day, novelty seems to become a supreme value in itself. The risk is that the attitude may be carried over into departments of life where obsolescence is unknown, where the total experience and accumulated wisdom of the human race are eternally valid.

Because more and more of the chores of living are turned over to machines, there is the danger that thinking and feeling may also be mechanized and standardized, which is to say dehumanized.

We may forget that there can be no electronic computers for setting standards of human probity, for measuring the great inherited truths, for differentiating between Good and Evil—that there can be no mechanical substitutes for conscience and compassion. It seems to me that our education—not alone in the schools but in the home, in houses of worship, in out-of-school activities—must seek consciously to erect strong defenses against such dangers.

We need to cultivate man's appreciation of his own importance and uniqueness as the child of God. The vastness of the spaces being opened up makes the individual seem terribly small by contrast—almost negligible in the larger scheme of things. But this is no more than an optical illusion. No matter how dramatically the known and accessible universe may be enlarged, the center of that universe remains man himself. Recognition of that age-old premise is the best guarantee of inner stability as the pressures of a changing world multiply. Without it, the human being will lose the sense of personal responsibility for his own conduct and for the course of history. He will become rootless, indifferent to the divine spark that sets him apart from lesser creatures.

Our education must leave no margins for doubt that science is made for man, not man for science. The only valid test of achievement in any area, now as through the millennia, is its effect on the individual human being. We must not, in short, allow him to be shrunk, demeaned and depleted, or to lose the vision of his own perfectibility.

It is to the credit of many organizations that they direct themselves to the hopes and fears of the ordinary, non-delinquent young people. In the final analysis, these, the overwhelming majority, will inherit the responsibilities of our community and must, therefore, be prepared for their role. Today that preparation poses exceptional difficulties.

We must help our children, in this time of great flux in human affairs, to find fixed points of faith and confidence. They should be taught the fundamental truth that under the turbulence of change there is a bedrock of unchanging values. Nothing that science or technology can conceivably

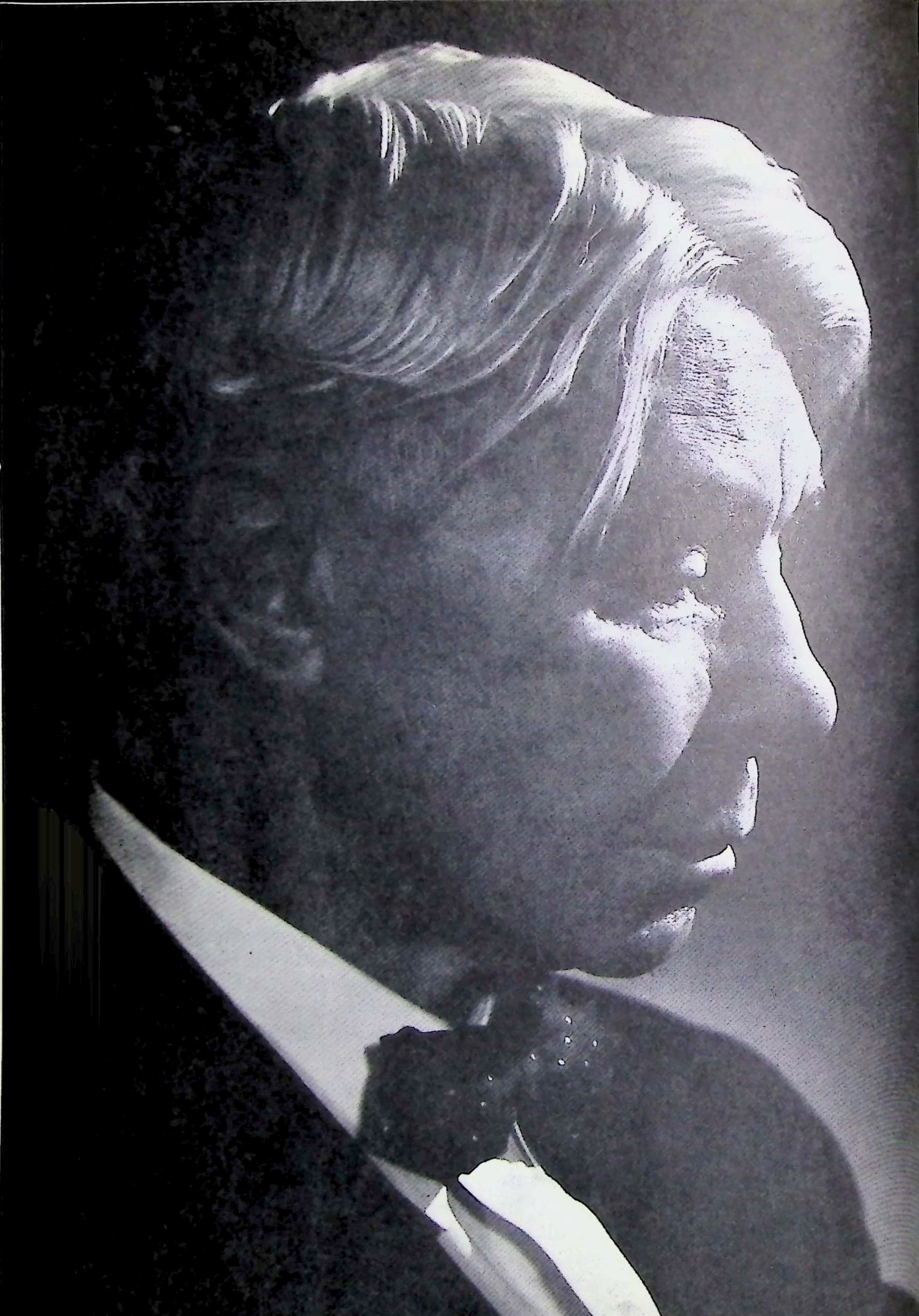
produce in the future will cancel out the moral imperatives and spiritual insights of the past and the present. The things that we most cherish—or at any rate that we should most cherish—cannot be displaced by machines. Freedom and justice, love and conscience, are not subject to automation.

At the time when the industrial revolution was first making itself felt, the great philosopher-statesman Edmund Burke wrote: "We know that we have made no discoveries, and we think that no discoveries are to be made, in morality; nor many in the great principles of government, nor in the idea of liberty, which were understood long before we were born. . . ." His words have been confirmed by nearly two centuries of discoveries such as were not dreamed of in Burke's age. Surely we have learned little that is fundamental about liberty and just government since the Founding Fathers wrote the Declaration of Independence and the Constitution. Certainly little that is new has been revealed in the realm of ethics, of man's relation to his fellow-man, since the sages of the Talmud wrestled with the problems of Right and Wrong. These are aspects of mortal existence more abiding than rock, intuitions that have stood the test of the total experience of man. For the growing generation they provide elements of certainty in a period of crowding obsolescence. They can give mankind a secure anchorage in the great tides of change, a sense of direction amidst the complexities of our time.

The Pulitzer Prize poet, Stanley Kunitz, once wrote: "The mind of the scientist, exploring space and matter, is closely related to the mind of the poet, whose task is to explore the inner space and the reality of things." The reality of things to which he alludes is the one that embraces the eternal verities of ethics and esthetics. They must be understood and nurtured—not despite but because of the pressing need for engineers and scientists.

We should put a premium on the exceptional individual, on unique talents and superior excellence. A society geared to the electron and the atom inevitably produces larger and larger social units. In industry or agriculture, in education or entertainment, the compulsion of the machine produces ever larger aggregates, involving thousands and tens of thousands of men and women. The very wonders of modern communication operate to spread the same ideas, appetites, behavior patterns to millions.

The pressures are for conformity and standardization. It is important, I think, that we do not lose the appreciation of, and incentives for, the uncommon man. Conformity must not be permitted to deaden our sense of appreciation of the infinite variety of life and creative impulses. The danger is that man will sink himself willingly, and even gladly, in the larger unit—that he will confuse democracy with mediocrity. In the technological age especially, we should resist the averaging of talents, ideals and visions. We must, rather, encourage the maximum development of each man's special abilities and insights.

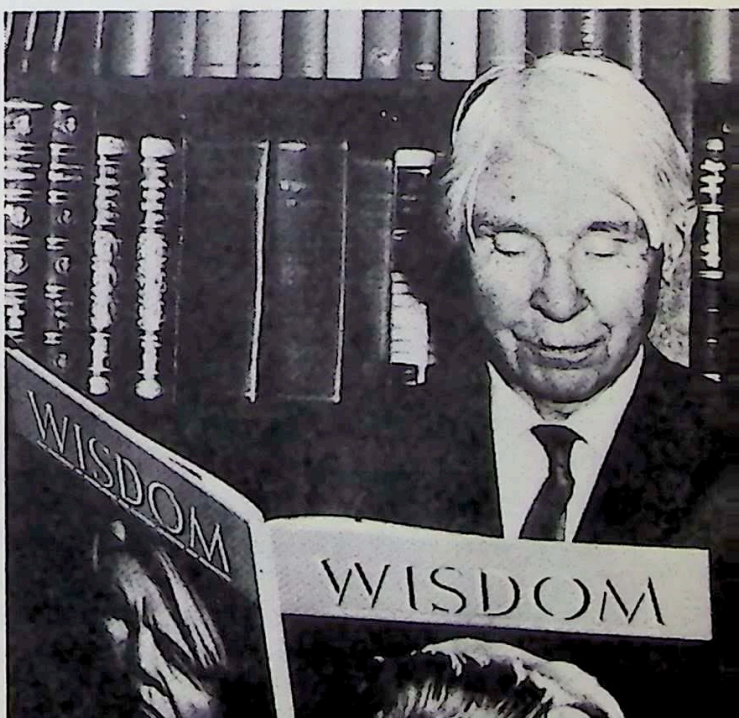


*Carl Sandburg, the distinguished American poet, biographer of Abraham Lincoln and twice winner of the Pulitzer Prize, appeared on NBC Television in 1953 singing folk songs with his own guitar.*

David Sarnoff's creative imagination has brought the priceless gift of knowledge, through radio and television, to a world starved for education, and has opened a universe of enchantment to people of all ages and all nations. Through the medium of television, he has embraced the whole circle of human emotions, touched the soul and elevated the spirit with its limitless range and immense power of expression. General Sarnoff will always hold a supreme title to the admiration and gratitude of mankind.

Carl Sandburg

CARL SANDBURG
*Historian, Biographer and Poet*




*An eminent recipient of the Wisdom Award of Honor, Carl Sandburg is shown reading the special edition of Wisdom Magazine on which he collaborated with the Editors of Wisdom. It was devoted to his wisdom and published in tribute to his distinguished achievements in American history, literature and education. When the famous biographer appeared on the NBC-Television Wisdom Series, he spoke with gentle and heart-warming eloquence of his lifelong dedication to*

In the past, there was no problem of providing basic human incentives. The primordial threats of hunger and pestilence kept people busy on the task of physical survival. But modern science, through its gifts of abundance, has sharply reduced these ancient goads to action and is likely to reduce them further. The temptation is to settle for creature comfort. The risk is that man may grow softer, more pleasure-loving, content to squander his increasing leisure on the trivial if not on the harmful. As against this, we must awarely counterpoise heroic goals and dedications. We must imbue our young people with a feeling of direct and personal responsibility. The growing generation should be taught that it cannot bypass the hard disciplines of the good life, or evade the rigors of defending our heritage of truth. It must be prepared to strive, aspire, work and yes, fight if necessary, for the principles that give meaning to our life.

Our civilization is today menaced by dehumanized doctrines like communism. Obviously we must have the best military hardware that science can produce to guarantee our survival as a nation of free people. But these will prove tragically inadequate, may even be self-defeating, if they are not backed by the hardware of the spirit.

While the world outside man is being explored and expanded, man himself remains to be understood and toughened. The gap between material progress and moral lethargy remains to be bridged. A renewed and revitalized respect for rock-bottom values, along with a determination to safeguard them at all costs, should make life as zestful and purposeful for the new generation as for any that went before. It seems to me that there is more to be accomplished in the future than has been accomplished in the past. The challenge is great—so is the opportunity.

I often tell young men and women: "You should find encouragement in the fact that you are young. You have a fine background of education and a long tradition of respect for learning and knowledge that equip you for creative effort and exploration along new pathways in the fields which you have chosen to pursue. Experience comes with age. It is not vital that you have it today, for you will be more daring as pioneers without it."

Scientific research is the basis for virtually all of the material things we have today and for the better things we hope to enjoy tomorrow. Many years ago I hitched my wagon to an electron, and I have never had any cause to regret my interest in the field of electronic research and scientific developments. While I am well aware of the truth of Edison's remark, "Youth does not take advice," nevertheless I cannot resist making a suggestion to young people—hitch your wagon to something in which you are interested and for which you have an aptitude. Select a goal and aim for it.

Those who have been born since the turn of the century naturally take

for granted dimensions of life which sixty years ago were barely discernible. When I was a boy the glory of Edison's electric lamp was a thing to marvel at, and the majority of Americans had not yet talked on the telephone. Motion pictures were called "flickers"; the automobile was called a horseless carriage or gasoline buggy—and there were many who doubted that it would get very far. Space on the earth was measured in weeks, not in hours or minutes. And space overhead was inaccessible. In 1900 the age-old hope of flying through the air was still a dream—the Wright brothers had not yet come on the scene. At the beginning of this century we were not only earth-bound, but in a communication sense, we were deaf, dumb and blind. There were no airplanes, no radio, no television. Since then, physics and chemistry have opened vast new horizons. Now on the looms are woven fabulous textiles made of synthetic fibres. And the physician, with the chemist at his side, is conserving and extending human life. The life expectancy of a child born today is being pushed forward through continued developments in antibiotics and preventive medicine.

Great is the inventory of this twentieth century. What a different world of business the young people of today are entering than the youth of my generation faced in 1900. Modern youth's heritage is rich and inspiring, replete with exhilarating opportunities. It includes substantial improvements in man's lot, a quickened sense of social responsibility, and unprecedented opportunities for service on both the material and the spiritual levels.

To the youth of America I say: My generation has only reconnoitered on the frontiers. Yours will push far beyond them—and you are fortunate in having both the electron and the atom young like yourselves. Whatever course you choose to follow, it will not be a chore but an adventure if you bring to it a sense of the glory of striving to succeed and to add something to the welfare and happiness of your community as well as to yourself. If you set your sights above mere personal security, you will avoid mediocrity. You are lucky to be young and to be living in a country so vibrant with opportunities. But your greatest advantage is the fact that you are Americans who are free to live, learn, work and advance, in an atmosphere where the dignity and rights of man are the foundations of our national structure. And they are foundations upon which a more stable world can be built.

Television—one of the greatest products of electronics—is laden with many opportunities for youth. It is an insatiable art, always calling for new ideas. And one day, not too far in the future, television programs in color as well as black-and-white will be seen around the world.

Ours is a world that holds plenty of problems and perils, but these are always part of the price of monumental achievements. Our failures, and they are many, for the most part spring from our successes. They reflect the growing pains of an extraordinary period in human history. Consid-

ering the handicaps under which we work we have not done so badly. Our heritage is rich and inspiring. It includes substantial improvements in man's lot, a quickened sense of social responsibility, and unprecedented opportunities for service on both the material and the spiritual levels. To be sure, the world is complex and full of hazard, and consequently, is not congenial for the lazy and the timid and the frivolous. Life today makes exceptionally heavy demands on courage and character, on leadership and patriotic dedication. For that very reason, however, the best among our youth will find greater stimulus and in the long run greater fulfillment.

Man's basic incentives—to obtain food, clothing and shelter, freedom from drudgery, oppression and fear—are still the same. But the opportunities for reaching these objectives are far different now from what they were when our fathers and mothers were young. Science, in their lifetime, has vastly changed the world. It is into such a world of progress that youth goes forth, where new forces open broader fields for unlimited growth and expansion.

I am conscious of the pitfalls and the problems of adjustment involved in our rapidly changing environment. The towering problems posed by the processes of change-over are at the heart of the challenge of our time. The key word in the world of practical affairs which the youth of today are about to enter is transition. It is the word that sums up the major tensions and dangers with which they will have to deal. Intelligent adjustment and reasonable accommodation, during the in-between period of transition from the present to the future, is the fundamental task awaiting young people preparing to take over the conduct of our complex society.

The heritage we are coming into is replete with the most exhilarating opportunities given to any generation. Great as this century has been, it will, I feel sure, soon seem only a prelude to greatness still in the womb of time. My generation has only reconnoitered the frontiers. Youth will push far beyond them. Both the electron and the atom are young. There are diseases to be extirpated. There remain swamps of intolerance, superstition and injustices to be cleaned up. There is important work to be done. So, let us not paralyze our capacity for good, by brooding on man's capacity for evil.

In recent years, there has been such obsessive emphasis on security, that I fear it has obscured older and more real values. Some young people have adopted Ferdinand the Bull, smelling flowers from dawn to dusk, as the symbol of the good life. I have been disappointed, at times, to find boys in their twenties, or even in their teens, worrying about pensions and old age security when they will have reached sixty-five. There seems to me something unhealthy where youth is so lacking in confidence. Maybe we have to relearn the meaning of ambition and of struggle. When has anything worthwhile been attained except by overcoming obstacles?

And the thrill, believe me, is as much in the battle as in the victory. In my career there has been hardly a tranquil year. I found myself, as an office boy back in 1906, in an art and an industry that have never stood still. In sixty years in radio and electronics, I do not recall a five-year segment without a major change. Looking back, I know that the experience has been so exciting and satisfying not despite, but because of its crowding changes and challenges.

Whatever course youths choose for themselves, it will not be a chore but an adventure if they bring to it a sense of the glory of striving—if sights are set far above the merely secure and mediocre. In one's personal life, as in world affairs, appeasement can be the shortest road to failure.

Youths need an earnest and a dedicated approach to life. Too much will be happening too fast in the years ahead to permit an easygoing or frivolous attitude. I do not mean that there will or should be no room for fun. I mean that the balance between the serious and the diverting must be readjusted in line with the new facts of existence. And there is no reason for self-pity on this score. A sense of responsibility and a zest for the good fight will be their own reward.

The need for able and courageous leaders in every area of our national life is pressing. There is less time than there used to be for youth to dawdle and postpone the plunge into responsible affairs. In the smallest community or the largest, young men and women will have to assume their place of greatest usefulness, without delay.

America and the world needs fresh energies, the fire and the zeal of youth, no less than the experience of its elders. The hazards of the world put a premium on intelligence. They have made it evident that we need, as a nation, not only more man power but more mind power. Universities represent the prime reservoirs of that mind power.

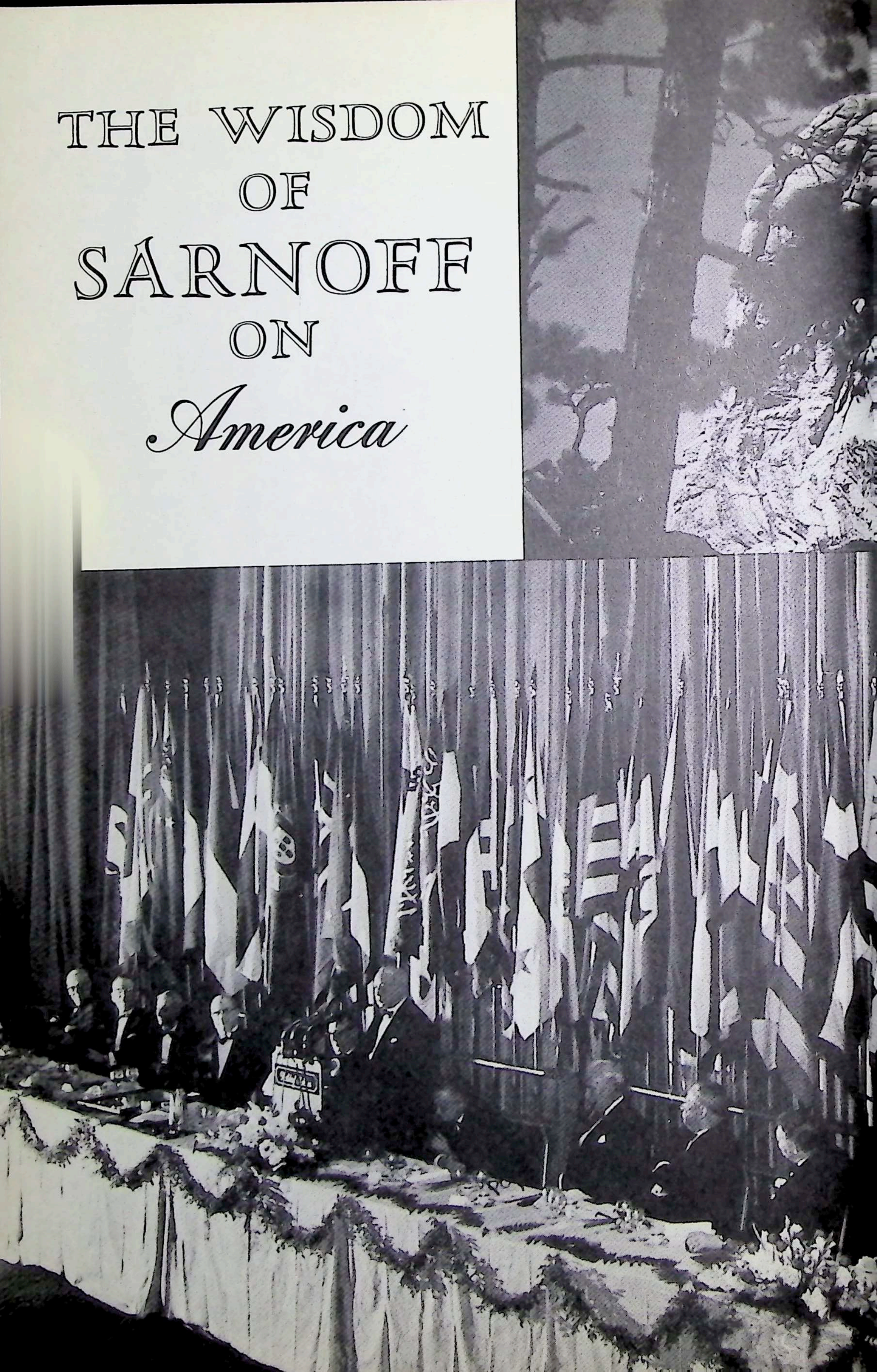
Machines are no substitute for minds. The most effective "electronic brain" is no substitute for thinking. The machine can never process more than is fed into it. The biggest mistake a college graduate can make, on the day when he receives his diploma is to suppose that his education has been completed. In truth, it has only started. Henceforth, life itself will be his teacher and it will be tougher than the toughest of his college professors in awarding passing marks.

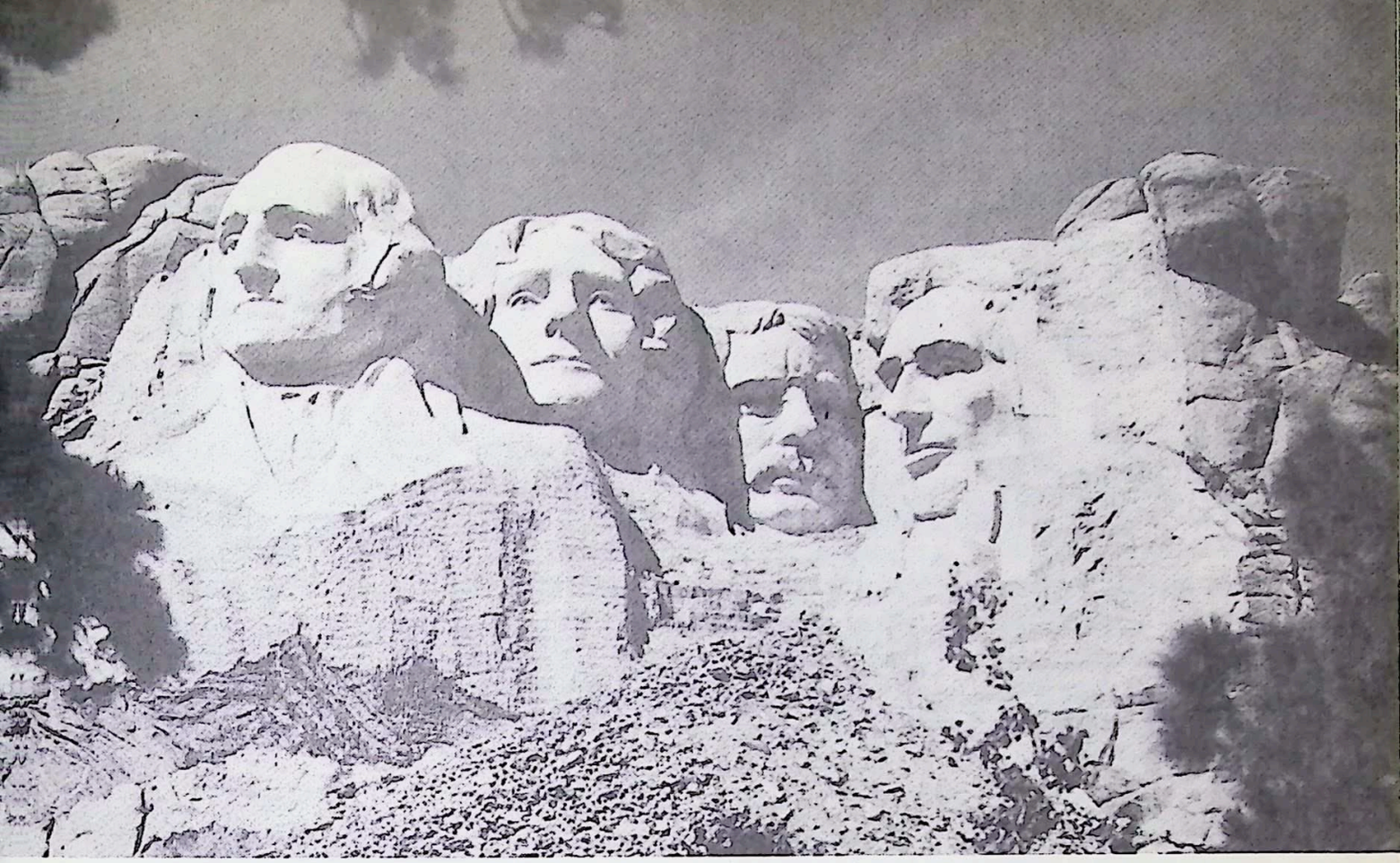
It may be consoling to young people if I point out that we, the so-called bosses, also have bosses over us—and I'm not referring only to our wives. There are boards of directors and stockholders and above all, the big public whom we must always woo and please. The notion that anyone in business ever reaches the stage when he is no longer bossed is a delusion.

*(Left) The Discovery of Phosphorus, painted in 1771 by Joseph Wright, vividly recreates the act of discovery of one of the most remarkable substances known to chemistry—a powder which gives out in the dark a continuous soft whitish light. Phosporus was discovered in 1669 by a German alchemist, Hennig Brand. The painting shows the old alchemist, his face lined from countless years of research, kneeling down in the presence of his two amazed assistants, to venerate the great miracle. It was the birth of a new and radiant element.*

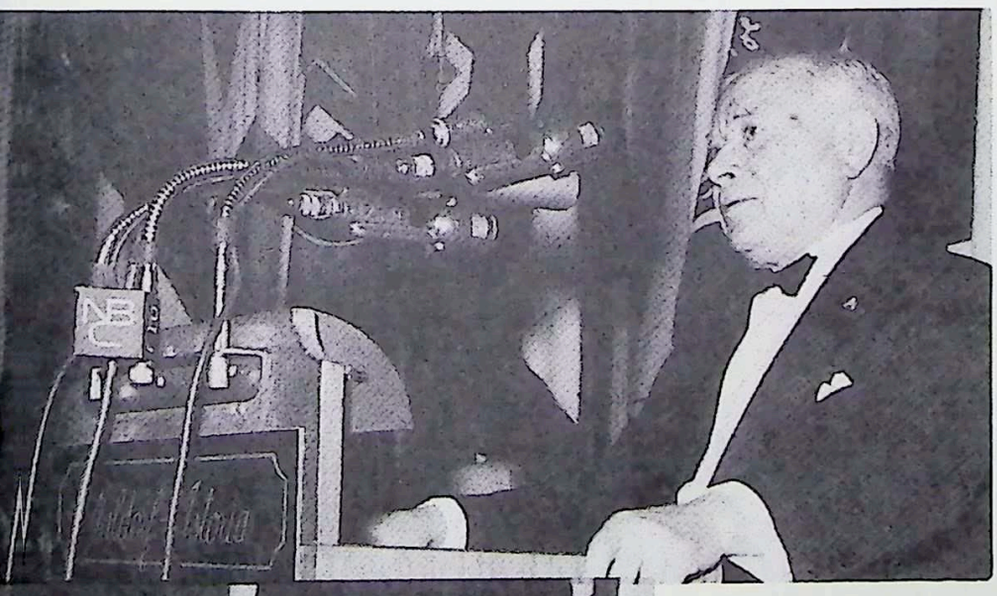
*French Physicist Marie Curie (1867-1934) in her laboratory, where her study of radioactivity led her and her husband, Pierre Curie (1859-1906), a chemist and physicist, to the discovery of polonium and radium. In 1903 they were the co-winners of the Nobel Prize in Physics. The first woman to hold the position of Professor of Physics in a French university (Sorbonne), Madame Curie was awarded, in 1911, the Nobel Prize in Chemistry for successfully isolating metallic radium. The process for obtaining radium she freely gave to the world without any thought to her own gain.*

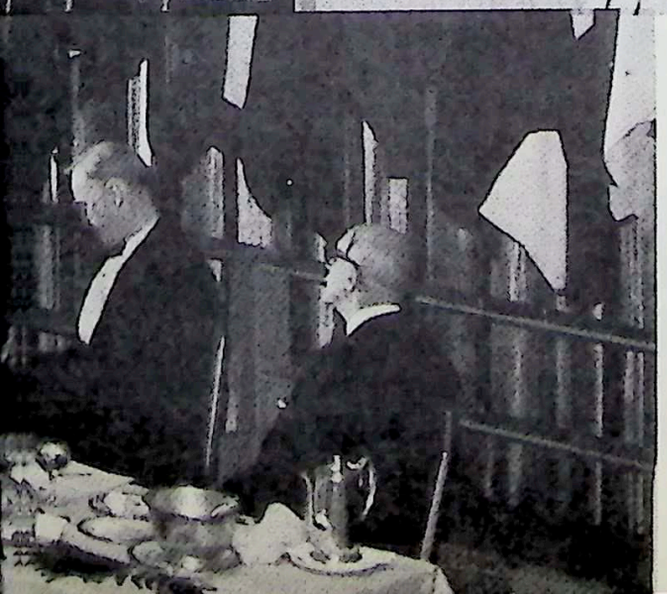
# THE WISDOM OF SARNOFF ON *America*





*The picturesque and inspiring national memorial to Great Americans—George Washington, Thomas Jefferson, Theodore Roosevelt and Abraham Lincoln—impressively carved in mountain rock on Mount Rushmore in the Black Hills of South Dakota.*





*One of the most famous public speakers in American history, General David Sarnoff is shown here addressing an audience of the nation's distinguished business leaders at the Waldorf-Astoria Hotel recently. His speech, "What You Can Do To Help Your Country," was broadcast on NBC and reprinted widely in newspapers and magazines.*

I wish there were some award for the myriad nameless immigrants—our parents and grandparents—who never attained celebrity but who have provided a substantial part of the bone and flesh and robust spirit of our country. I often marvel at their courage in pulling up roots in the old country, and their sacrifices in sinking new roots in the American soil. It is too easy to forget how hard were their lives and how bravely they met their challenge.

It seems to me that no one who is not himself an immigrant, or the child of immigrants, can quite comprehend the magnitude of their adventure or the pathos of their transplantation. When I arrived in America, I was nine years old; so I remember what it's like to find oneself in a strange new world. As an immigrant boy, I was tossed into the bewildering whirlpool of a metropolitan slum area, to sink or swim. I started my business career, at once, by selling newspapers on the sidewalks of New York. I learned the hard way what a helping hand, a sympathetic word, a reasonable opportunity, can mean in giving hope to a new arrival in this wonderful land.

I look upon a citizen of the United States as the most fortunate individual on earth. Of all the new things the immigrant learns when he makes his home in America, the easiest lesson is to appreciate the privilege of his citizenship. For he brings with him standards of comparison which the native American often has no opportunity to observe first-hand. And the very fact that the immigrant's citizenship is a treasure he does not get by inheritance, but must earn for himself, enhances its value in his eyes.

President Roosevelt once remarked that, except for the Indians, we are all immigrants. American society has been built, like coral islands, by the slow accretion of layer upon layer of newcomers from all parts of the world. And it derives much of its strength, again like coral islands, from that process of growth.

Nearly all immigrants came to these shores with empty pockets, but not with empty hands and hearts and souls. Some of them brought immense gifts of brain and brawn, of enthusiasm and devotion, which have become part of the greatness of America. There is indeed no department of our national life—its economy and arts, its trades and professions, its science and education—to which immigrants have not made outstanding contributions.

Along with our sincere thankfulness to America, for opening wide its doors of opportunity for individual development and progress, I think we who have immigrated should nurture a confident sense of belonging —of having pulled our weight in the nation's aggregate life.

In every generation, new stars appear in the social, scientific and economic

firmament. In a changing world, the very changes create new opportunities for young men and women who are not bound down by patterns of the past. I can make such an observation with confidence because I am talking about the United States. It is still the land of opportunity. Still a young, vigorous country, the peak of whose achievements lies in the future, not the past. Such a country still offers incentives and rewards to the pioneering spirit.

I look upon the United States as a land of opportunity, not so much because it is young, as because it is free. In this blessed land, freedom is from the inside out—a national freedom that is genuine because it radiates from the personal freedom of each individual citizen.

Our American institutions are built upon the concept of the personal dignity of man. Society and government value the citizen, not as an impersonal fraction of a national mass-mind and mass-economy, but as a sacred human soul.

Justice Felix Frankfurter stated: "If one faith can be said to unite a great people, surely the ideal that holds us together beyond any other, is our belief in the moral worth of the common man, whatever his race or religion." That is the acquired heritage of which the thoughtful naturalized citizen of the United States never ceases to be conscious—for which he never ceases to be grateful. By this freedom he is privileged to serve his country and society, and thus to serve himself.

In our blessed land, national freedom has become a cherished reality because it radiates from the personal freedom of each individual citizen. To us, the individual is the central element in our society. His consent is the essence of our political life. His happiness is the heart of our economic philosophy. His moral progress is the soul of our spiritual order. It behooves us, who espouse freedom, to remember that today, the American cause has become inseparable from the cause of all mankind.

The patriotism of our people, the ingenuity of our scientists and engineers, the skill of our labor, the efficiency and productive capacity of our industrial plants, and the dedicated men and women serving in the Armed Forces and in other branches of our government—all these make it possible for us to accomplish the necessary tasks, to preserve our freedom and maintain our status as the leading nation in the world.

We are living in a world of unprecedented change and great peril. Our civilization, our morality, everything we cherish for ourselves and our children is today at stake in the world-wide contest between freedom and slavery. The challenge is real and the danger is present. Not in centuries has mankind faced a historical crisis as basic, or as far-reaching in its possible consequences. Destiny has placed our beloved America in

a position of leadership on the side of freedom. It is a position we must not surrender.

We cannot, we dare not, evade our heavy responsibility. And to meet that responsibility effectively we need the maximum degree of national unity, mutual tolerance, and social peace. Even America's energies, resources and productive might are not unlimited. We need to conserve them for the great task of defending freedom on this globe. We simply cannot afford to dissipate our strength in bickerings among ourselves.

Because we live in a time of great technological development and rapid change, the need for understanding and adjustment is imperative. Above all, it applies to the relations between employers and employees. The machinery of our nation's life is too complex, too deeply integrated, too finely balanced, to be subjected to the blows of unnecessary, unwanted, uneconomic strikes, lockouts, or boycotts.

Let us not be stampeded by shadows and hobgoblins. The march of science cannot be stopped. Nor, in the last analysis, would any of us stop it if we could. Of course, it brings problems at the same time that it opens up opportunities. It cancels out some jobs while stimulating others and creating myriad new ones. It imposes upon us periods of necessary physical and psychological adjustment.

The process of obsolescence and birth, of depletion and renewal, is in the nature of life itself. In America it has been the lifeblood of progress surging toward ever higher levels of abundance—an abundance, moreover, shared ever more equitably by ever more of our citizens.

We can grovel before the mighty forces of science the way savage man grovels before natural phenomena he does not understand. Or, we can meet them with courage, with wisdom, with a determination to channel them for useful and beneficent purposes. This choice is ours to make.

I am certain that tomorrow, like yesterday, more jobs will be created than abolished. New industries and new products will come into being. People with more money to spend, will reach out for new services that will provide more adequately for the needs of their families and education of their children.

The opportunity to advance socially and economically with the progress of science and technology, depends primarily upon the preservation of our freedoms and our rights as individuals. The greatness of America rests, in the final analysis, upon its freedom. Not merely to basic political freedoms, but to freedom of thought and research, of venture and adventure. These have produced an environment propitious for pioneer-

ing, enterprise and growth. They have bred a spirit of self-confidence. They have made America the greatest and freest country in the world.

This unique nation we have helped to build, this way of life we cherish, has become the main bulwark of Western culture and Judeo-Christian morality. The core of it is a belief—a belief so deep that it seems to us beyond argument—in the dignity and value of the individual human being.

We have an important job to do of presenting the truth and the facts about World Communism to those in other lands whom the communists seek to subvert. And the truth about World Communism must be made clear to all Americans so they will understand its perils. We must develop suitable means for delivering our message to all concerned, wherever they may be. This is not an impossible task.

The time when government could be left exclusively to professional politicians is past, never to return. For government has become almost coextensive with life itself. Directly or indirectly we are called upon to help carry its burdens. To be only a critic on the side lines is not enough.

Liberty is not a set of laws and documents. It is a way of life based upon deep-rooted political, spiritual and moral values. Liberty is to our spirit what oxygen is to our body. Without its life-sustaining force we would be suffocated. We know in our hearts that the elemental human freedoms summed up in the concept of liberty—whether our own or other people's—must not be used as bargaining counters to buy off despots.

Our generation owes our heroic Americans—the nameless and the known alike—a great debt of honor: to safeguard forever all that they so nobly and successfully defended. On this debt we must not and shall not default. We must make it clear to the entire world, and especially to those who threaten our country, that the qualities shown by our heroic dead have not been interred with their bones; that these qualities live on in the American people, as strong today as ever in the past.

We should leave no margin for doubt anywhere about our inflexible determination to defend the human ideals which are the foundation stones of our national structure. We shall shrink from no sacrifice demanded by this fixed decision.

We live in a world filled with menace, in a time fateful for the future of the human race. The character of the challenge we face today makes it important not only that we stand ready to defend our heritage but that we be aware of the special values—human and American values—comprising that heritage. We must know what we are defending and why.

Until society finds the wisdom to abolish war, we have no alternative but to keep America strong enough to resist aggression. The surest way to discourage an attack upon us is to be prepared adequately to meet it successfully if it does come. We must maintain our nation's leadership and remain as the great outpost of freedom.

I do not for a moment underrate the threats that lurk in a technological world. But I submit that they need not intimidate us. There is significance in the fact that in America inventiveness and freedom have sprung from the same soil and flourished side-by-side, each reinforcing the other. This is no accident. Creative science finds its fullest and truest expression only in a climate of freedom.

America today stands as the main bulwark of Judeo-Christian civilization. Surely we who are children of this great country must strive to measure up to the splendors of its history and its destiny.

Today the job of keeping our beloved America safe and free is a job for all the people. If we recognize the nature of the threat and are prepared to make the sacrifices entailed, the job can be done. We have what it takes, provided we use it to the full. Destiny has placed our nation in a position of leadership which we cannot shirk or escape. Not only the independence of America but the survival of our civilization depends on our willingness to acknowledge reality and to avoid the narcotics of self-delusion.

Harmony is desirable at all times, by any common sense test. In the present period it has become an absolute necessity. For America it has become the very condition of survival.

The struggle between freedom and slavery which marks this historical era has been expressed in political and economic terms. But at its core it is a contest between two utterly different and wholly incompatible views of man's role on earth.

To the communists and totalitarians of all colors, the human being is inert matter, the raw stuff for building a state or a system. To us, man himself—not a class, or a state, or even a social system, but the individual person—is the central element. His liberty, his human dignity, the unfoldment of his creative potentials—these are the paramount and decisive tests of all that we cherish. His consent is the essence of our political life. His happiness is the essence of our economic philosophy. His salvation is the essence of our spiritual order.

The concept of the human being as an independent entity, harboring an immortal soul and second only to the angels, is not, of course, an

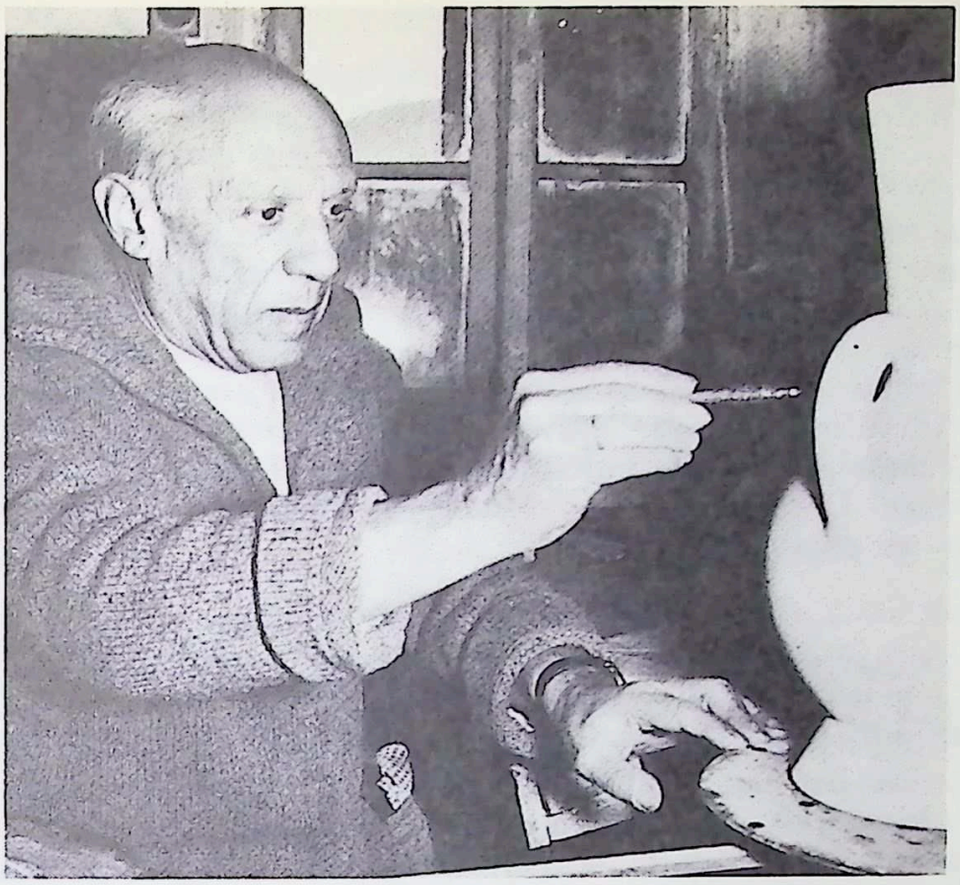
American creation. It has been at the heart of all great religions, the ideal celebrated by prophets and poets through all recorded history. In America, however, we have come a long way toward translating this ideal into viable institutions. Where we fail to live up to it, we are frankly conscious of the failure and in earnest to make amends. This concept has been expunged in countries under the communist yoke. It has been outlawed and rated as a crime. A third of the human race is being taught that man is a thing, not a person, without inherent rights which society must respect. All the resources and skills of the communist world are being applied to the task of imposing this perverted and dehumanized system upon the part of humanity which still remains free. And our country is the prime target of this monumental and incessant attack.

Perhaps beyond any prior generation, ours is called upon to muster the material vitality, the moral fervor, the confident faith and intellectual understanding that will guarantee peace or—should the peace be shattered—will guarantee victory. It is only in these terms that we can hope to pay in full the debt of honor we owe to our armed forces. We must take resolutely to heart the lessons of their death on battlefields.

No great nation can survive on its knees, or would consent to survive on such terms. No great people dare forget that there are values in life which transcend life itself. Today, Americans display indomitable courage amid the crescendo of conflict, far from their native shores. Often they show a special brand of courage that drives them on even in the face of fearful odds, a courage that makes them advance into enemy machine guns spraying death all around them. In the skies, on the ground, and on the seas, they make courage dramatically synonymous with the word American. In this period of crisis we would do well to take their lesson of courage to heart. For only with unwavering courage can we face up to the communist campaign of bluster and blackmail. Only with that sort of courage can we meet and defeat the Red strategy of nibbling and intimidation.

Only with supreme courage can we overcome the constant temptation to compromise on principles in the name of expediency. We must keep our eyes on a compass of principle to help us steer a true course. Without its fixed points of integrity, we are helpless in the winds of propaganda and the storms of abuse blowing from Moscow and Peiping. As General Dwight D. Eisenhower has said: "Firmness in supporting principle makes war less, rather than more, likely of occurrence."

The safeguarding of our precious freedom cannot be bought cheaply, nor can it be bought once and for all. Each generation of Americans must be ready to buy it anew, paying when necessary in the coin of life and treasure. American heroes gave up everything—families, friends, careers, and, in the final reckoning, life itself—so that our nation might survive. It was their selfless sacrifice that cooled the fury of aggressors,



*Early in 1967, "Bravo, Picasso!" was presented on the NBC television network in honor of the world-famous artist's 85th birthday. The color special offered a biography of Pablo Picasso through his magnificent paintings. Picasso (above), as television audiences saw him at work in his studio some years ago on the NBC-Television Wisdom Series. Picasso was also honored with a special edition of Wisdom Magazine which was devoted to his wisdom and published in tribute to his unique accomplishments in art.*

The eloquent testimony of greatness is convincing evidence that the true fame of David Sarnoff is destined to be sustained by the judgment of posterity. Sarnoff, so great in the 20th century, will be still greater in the 21st.

PABLO PICASSO

exposed the follies of dictators, and gave thrilling expression to man's eternal striving for freedom.

Today, more than ever, we must face up to the likelihood of sacrifice on an unprecedented scale. The sacrifices implicit in modern nuclear war are far more widespread than those in the past. No longer is there immunity for women and children, or sanctuary for the aged and infirm. The very magnitude of the danger underlines the importance of a will to sacrifice. If we must choose between securing our national defense and giving up some measure of individual comfort or luxury, the decision is crystal clear. Because to enjoy luxury—particularly the luxury of freedom—we must first survive.

Only by being prepared for war can we hope to preserve peace, or to win a war if it is forced upon us. In 1917, and again in 1941, we were tragically unprepared for war. Who among us can estimate how many lives were lost because of this unpreparedness? In the two World Wars, we were able eventually to triumph because gallant allies held the lines while America mobilized its industrial strength and military man power. But in any future conflict we cannot count on this saving interval of time. So swift is the pace of modern warfare that we must be adequately prepared before the start of hostilities.

Long ago, a famous British Admiral, Viscount Horatio Nelson, remarked that "five minutes may make the difference between victory and defeat." Under today's conditions, we could well modify his warning to read: "The first five minutes may make the difference." Our primary duty is to maintain American military vitality constantly "at the ready," whatever the strain and the cost involved.

Loyalty to our country is loyalty to ourselves—an extension of the loyalty one feels to his own family. A nation is not merely a piece of real estate. It is a complex of deep-rooted traditions and ideals, principles, and preferences—a pattern of irrevocable commitments to the past, the present and the future. In the final analysis, the preservation of a free society depends upon the conscience and sense of duty of its citizens.

Let us remember that all of us are, in a sense, veterans of a continuous testing of our mettle. Let us be ever mindful that our beloved United States will deserve to remain "the land of the free" only as long as it remains "the home of the brave." Let us dedicate ourselves, in Lincoln's imperishable words, "to the unfinished work which they . . . have thus far so nobly advanced."

America has never stood before the world as a military nation. It is part of the fundamental character of our people to love peace, to be opti-

mistic, to hope for the best, to want to live and to let live. Witness the extent to which we have permitted American communists to spread their evil doctrines among our own people, to advocate openly the same poisonous ideas that have brought strife and misery to other sections of the globe.

The communists smother the truth with their falsehoods. They are experts. But through radio and television, the motion picture and the printed word, we have a great opportunity to reveal the truth to the rest of the world. We must expose the lies and spike false propaganda that comes from behind the Iron Curtain.

Our formula is the big truth. We must tell the big truth about the big lie. If truth is incapable of overtaking the lie, then there is something seriously wrong with our whole structure of life. But we can reassure ourselves—the truth will prevail. It must prevail. It is the foundation of democracy, and it is the basis of our belief.

Communist propaganda exploits hunger and misery to advance its evil crusade. It promises fulfillment of the legitimate aspirations of the masses. But, what has it brought them instead? Purges and executions; forced labor and police terror; civil war and starvation. Communism makes a mockery of freedom and justice, enslaves its victims and destroys their hopes. We must expose and denounce the dictators and masters of these betrayed people. At the same time, we should bring them a clear message of hope. We must help these victims to unshackle their chains of slavery and to achieve their own liberation. We must speak to them as people, as man to man—and as good neighbors across a garden fence—not in a weak voice across the hemispheres.

Let us remember that effective propaganda is inseparable from effective national policy. The Voice of America can state but it cannot create the policies of America. The mind must guide the tongue. If our national policies are hesitant and confused, they can only convey a sense of weakness and uncertainty. Any lifeline that is offered must be made of stronger stuff.

In a world that is far from settled, where peace is a hope but not yet a reality, our policies and our plans must be made and remade to fit the fluid situation. This calls for national unity at home if we are to reflect it abroad. Now is the time for a moratorium on politics. I do not mean that we should stop constructive criticism, for it is a necessary element in any free society. It can aid our government and our leaders in all fields of endeavor. It can aid the whole world. What we need is a closer and a stronger link between the brains of America and the brawn of America. The best brains in our country, regardless of political affiliations, are needed to help solve the pressing problems in this time of trouble and to defeat the cunning of the enemy.

The ambitious Russian program is based upon resources that do not begin to compare with those of the United States. The history of Russia is marked by political, agricultural and industrial ineptitude. Until recent years, she was a backward nation in all three categories and is still far behind the United States in science, in agriculture and in industry. Even with the help of her satellites, Russia does not grow enough food to meet her own requirements.

A part of the big truth about America is the story of unmatched agricultural, scientific and industrial achievement; of opportunities for individual initiative that develop under the free enterprise system; of national teamwork; of social and economic progress. But this is not the whole story. The spiritual part of America is even more important. Our freedoms to worship as we please, to think and to speak, to listen and to look, to work and to live where we choose, are precious privileges of our peaceful way of life. All these now are threatened by the enemies of freedom.

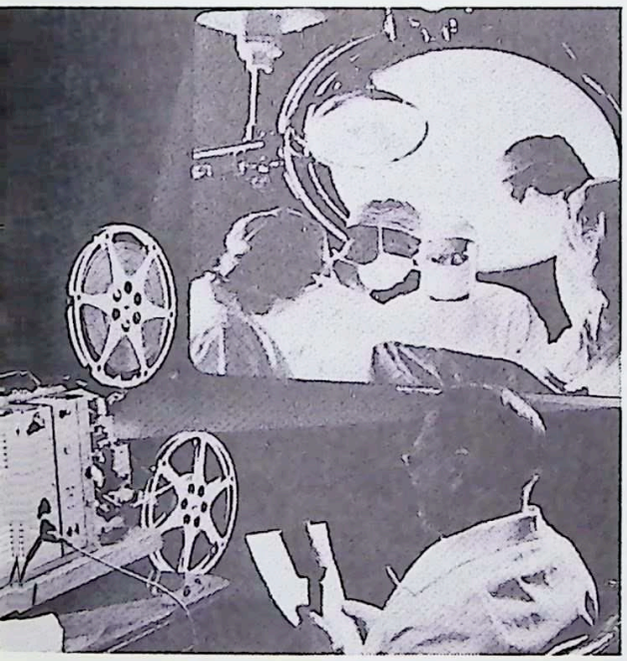
Experience has proven that our people want to know the facts and are not afraid to learn the truth.

Love of country, rooted in patriotic feeling, must be backed by knowledge and understanding. The allegiance of the heart must be joined with an allegiance of the mind. The American cause has become inseparable from the cause of all mankind. America has become the chief repository and the chief rampart of the liberties, the moral precepts and the spiritual insights that add up to a civilization.

*Pearl S. Buck, the greatest woman novelist America has ever produced and an eminent recipient of the Wisdom Award of Honor, reading Wisdom Magazine shortly before a special edition of Wisdom was published devoted to her wisdom and in tribute to her distinguished achievements in literature. Winner of the Nobel Prize and the Pulitzer Prize, Miss Buck appeared on the NBC-Television Wisdom Series in a conversation about her childhood in China, and pointed out the basic differences between the Western and Oriental approaches to living. She also discussed the changes that have taken place under the communist regime in China, and what her books have done to interpret the Oriental mind and way of life for her fellow Americans.*

*Painting by Robert A. Thom.*

*Andreas Vesalius of Brussels, the first great teacher of anatomy from natural observations, conducted many anatomical demonstrations on human bodies while Professor of Surgery and Anatomy at the University of Padua, 1537-1543. Highly successful, these were attended by medical students, physicians, sculptors and artists. His monumental anatomical text became a classic in medical literature.*



*A professor of medicine using RCA's sound projector records his voice for a TV film on surgery.*

# THE WISDOM OF SARNOFF ON *Medicine*

*Under the eye of the RCA color TV camera for medical use, operations are performed and telecast for viewing by surgeons and students in other parts of the hospital or the city.*

A beneficent impact of technology can be expected on our human resources. For one thing, man's life span will be further extended and his productive years increased by vital progress in preventive medicine, diagnosis and treatment of human ills. Two thousand years ago, the average baby born in the city of Rome had a life expectancy of scarcely twenty years. Today, a baby born in this country can look forward to a life expectancy of seventy years. In a few more decades, the normal life span of an individual will approach the century mark, taking some of the force out of Dr. Albert Einstein's complaint that "the trouble with civilization is that we don't live long enough to make use of our experiences."

I often suggest to the great physicists, specialists, and scientists that, in looking for solutions to such dread diseases as leukemia and cancer, they should not forget that in our lifetime science has produced new tools that did not exist in the past. That there is an obligation upon the medical profession to learn and understand, to utilize these new tools of atomics and electronics, just as there is an obligation upon the physical scientists to bring to the attention of the medical profession answers, insofar as they can supply them, and to understand the problems of the medical profession.

Somehow, I feel that between the medical profession and the physical scientists there is still a gap that needs to be bridged. Certainly, great discoveries have been made in the field of medicine in recent years. We know now how to deal effectively with pneumonia, and tuberculosis, and with polio—but how little we know about the dread diseases that are still the scourge of humanity: heart attacks—growths, cancer and other malignant diseases.

It seems that if we can photograph and understand and analyze the composition of stardust millions of miles away, if we can get information from the moon and the stars and the planets by instrumentalities which already exist, if we can learn and understand so much about the atom and the electron—why can't we learn more about the human cell? Why are we able to learn everything about what is outside of us, and so little about the inside of us?

I have the greatest faith in the possibilities of science, providing the answers to the problems of human ills. I have often said that I have greater faith in the scientist than he has in himself. What is wanted—what is needed—is first an understanding of the problem, then a concentration upon it—then an encouragement to those most competent to dedicate their lives and dedicate their skills to the solution of problems for the benefit of all mankind.

Because of its amazing versatility, electronics has had an impact on virtually every aspect of human existence. That includes the field of

health and healing, where electronics already has made some significant contributions and where its potentialities for the future seem even greater.

The more we explore their relationships, the more impressed we become by the kinship of electronics and biology. Both depend heavily on physics and chemistry and present phenomena which can be grasped only when the structure of the atoms, and the forces within and between them, are understood. Increasingly each of them depends on a close study of the solid, liquid and gaseous states of matter. But the kinship goes much deeper. Perhaps the most significant clue to their affinity is that electronics and biology alike place basic emphasis upon minute component elements, the so-called "elementary particles."

In the past, man concentrated attention on massive entities and their gross or general form. In the electrical field, the primary concern was with big motors and generators, large conductors and the like. In biology, interest was directed to the visible and tangible parts of the living organism. Structure held the center of the stage. In recent years, we have seen a radical shift of emphasis to the tiniest particles—the invisible building blocks of the universe. The infinitesimal has been recognized as the most potent and controlling aspect of nature. We in electronics work with the atom and its nucleus, with electrons, protons, neutrons, ions. Experts in biology study bacteria, viruses, the gene, the cell, and the still smaller building blocks—the complex molecules of biochemistry. That meaningful parallel is reflected in the guiding principles, methods and insights, trends and scope of inquiry which are common to both fields. What is more, as our tools of investigation are further sharpened, the present strong resemblances portend discoveries which may reveal actual identity.

The communication theory, which is at the heart of many electronic systems, applies also to human beings. The degree of similarity is really astonishing. About seventy years ago, a French physicist, Edouard Branly, was testing different theories as to how nerves carry messages from the skin to the brain and back again. He noted that the nerves are not continuous fibres but are formed of neurons and synapses, closely massed but not necessarily in contact. Applying this discovery to electromagnetic or radio waves, he found to his own amazement that a similar principle held good. The first successful detector of radio waves, the Branly detector, was thus the result of observations in the biological area. Branly's intuition was merely a beginning. Since then it has been demonstrated that the physiological message-carrying system is the archetype of what the electronic engineer seeks to duplicate.

In order to form an integrated functioning unit, man's trillions of cells must be electrically and electrochemically interconnected. This "intercom" system consists of groups that operate concurrently in what we in electronics call a "multiplex system." The connective channels, or neurons and secretions, work both inwardly and outwardly. Inwardly,

they carry impressions from the sense organ to corresponding cells within the central nervous system in the brain and spinal cord. Outwardly, they control muscles, glands and other body elements. They function to coordinate messages from one part of the body to another. Additional channels continually report back to the brain the extent to which a willed act is being performed, and associated brain cells initiate and control any needed corrective action. In electronics, this is the familiar principle of "feedback." This marvelous communication system inside man, makes the most elaborate outside communication system elementary by comparison. Yet the underlying parallels between the body's communication system and that of electronic equipment—in the most advanced computer or "electronic brain," for instance—are remarkable. They challenge our imagination.

Already the impact of electronics upon biology, medicine and related disciplines is far greater than many practitioners, let alone the public, realize. A great array of electronic tools and techniques is today in use or available for use by physician and surgeon, anesthetist and radiologist. And even more promising devices are now in various stages of gestation in electronic laboratories. Literally every electronic advance for communication or industry yields new knowledge, enabling readier access to hitherto impenetrable recesses and aspects of the human body, and the production of more effective instrumentalities for medical and surgical practice.

Television is thought of primarily as a mass medium of information and entertainment. Yet closed-circuit television, both in black-and-white and in color, has become a vital adjunct to medical education. Electronic computers are thought of primarily in relation to industry and business. Yet their capabilities are multiplying the effectiveness of every man and woman engaged in biological and medical research.

The researcher in biology and the diagnostician in medicine depend largely upon the tools at their disposal. They need electromechanical, electrochemical and electrothermal equipment; acoustic devices; high-speed apparatus for measuring, recording and analyzing data; methods of high magnification. In all these respects, electronics is increasingly at their service. It can relieve the professional worker from many routine tasks by collecting and processing information automatically, instantaneously and with unprecedented accuracy. Electronic devices can perform jobs involving differentiation between similar objects. They can count them in a given area, record and store the resulting data, make them instantly available when needed, and compute the degrees of their correspondence or difference.

One of the major contributions of electronics is by this time fairly familiar —the electron microscope, which surpasses the capacity of the optical microscope at least one hundred-fold. Of immense importance in chemistry, metallurgy and other industrial fields, it is equally if not more

valuable to the biological and medical worker. Then there is the electronic stethoscope, which picks up heart sounds, chest vibrations, or sounds from other organs, and amplifies them accurately for a telephone headset or loud-speaker. It yields far more information than the conventional stethoscope. Recently a capacitance pickup has been developed for the study of heart sounds and the early detection of heart defects. Today blood pressure and the pressure of spinal fluid can be measured electronically and indicated directly. The same is true with respect to currents generated within the brain. New electronic tools promise significant expansion and refinement of present methods of electroencephalography.

In research, the so-called alpha and other rhythms in brain-generated electricity have been studied for as many as fifty thousand samples obtained and recorded in three minutes, then promptly analyzed by electronic means. Unquestionably, electronic techniques can be expected to yield enormous new understanding of the brain, ultimately helping to solve some types of mental disorders and some brain tumor problems. Similarly the principles of radar and sonar, so vital to national security, have found valuable applications in diagnostic medicine. Sonic and ultrasonic vibrations are focused on the bodily area under examination. When they strike internal structures, they are absorbed or reflected. The reflections are systematically detected and the location of an obstruction exactly charted. Unlike X-rays, ultrasonic beams can detect cysts and growths which differ in structure, but not necessarily in density or effective atomic weight, from the surrounding mass.

Electronics is of increasing importance to the radiologist. He has always contended with the risks of physiological damage where prolonged exposure is necessary. One solution of this problem has been found in electronic methods of amplifying the brightness of the picture, thereby permitting a smaller X-ray dosage. It is also proving possible electronically to sharpen the edges and the contrast in X-ray pictures and to improve stereoscopic pictures, those taken from a number of viewing angles simultaneously.

Electronics permits the direct study of organic specimens with a kind of invisible radiation called ultraviolet. While unstained cells are commonly uniformly transparent in the visible, their component parts exhibit sharply differentiated absorptions in the ultraviolet spectrum. The newly developed ultraviolet color-translating television microscope employs a modified color television technique to translate differences in ultraviolet absorption into visible color differences. With its aid, natural tissues yield color pictures revealing at a glance the distribution of important chemical constituents in the cell. The great promise of the method for fundamental biological research is obvious.

The surgeon has a particularly large stake in enlisting the electron in his service. The most spectacular development in this area is electronic

mechanisms acting as temporary substitute organs in the human body while the natural organ is being worked upon. That a man-made device could ever, however briefly, take over the functions of a bodily organ would have seemed wildly improbable before the Electronic Age. But to a limited extent this goal has already been reached, bringing within the bounds of feasible surgery some operations formerly considered imprudent, if not impossible.

The most dramatic of the substitute organs is the artificial heart. Here we have an electrically driven and electronically controlled device which bypasses blood flow around the heart and carries out the normal effects of the heart beat while maintaining a pace adjusted to the needs of the patient. When one reflects that the blood must not clot within the artificial heart, that temperatures and pressures must be maintained with the utmost precision, it is clear that here we have a case where medical science is stranger than science-fiction.

Paralleling the artificial heart, we have the development of an artificial lung and an artificial kidney, each bypassing the natural organ while it is being examined or repaired, each made possible by electronic sensing and control devices. Inevitably one wonders whether the use of artificial organs need forever be restricted to the operating room. In theory, at least, it is conceivable that one day compact electronic substitutes will be provided on a permanent basis to replace organs that have become defective through injury or age.

Artificial kidneys, lungs and even hearts may become as familiar as artificial teeth or hearing aids. Indeed, one may imagine a man walking around in apparent good health with several of his organs replaced by the refined electronic substitutes of the future. Admittedly the idea is fantastic, but, as the marvels of electronics unfold, the line between fantasy and fact is even harder to define.

In the field of orthopedics, electronic methods are not yet at the point of major utility, but important possibilities are in evidence. Electronic apparatus for systematic and automatic exercise of any part of the body —in cases of partial paralysis, for instance—are already far advanced.

Electronics promises sensational improvement of prosthetic devices. At the heart of this promise is the electronic capacity to amplify the minutest muscular efforts and impulses to almost any desired magnitude by equipment which, attached to the stumps of an amputated limb or to some other part of the anatomy, will actuate and control movements of an artificial leg, arm or even fingers with acceptable precision.

For the nearly deaf, bone-conduction receivers or compact electronic equipment for large audio amplification now in use are being constantly

improved, and other expedients under study show encouraging prospects.

Among the most humanly exciting electronic potentials now at the experimental stage are devices that in some measure "see" for the blind. Interesting beginnings have been made, for example, toward electronic detection of obstacles in the path of the blind, or sudden changes in the ground or pavement levels. Progress is being registered, too, in electronic equipment for translating ordinary type into audible signals, thus enabling the blind to "read" conventional printed matter.

The inventory of the electronic contribution to biology, medicine and surgery is far from complete. Every piece of new equipment, it should be remembered, tends to become the progenitor of a whole family of devices, each adapted to additional uses as refined to meet more complex conditions. The same principles of energy under precise controls which, at one extreme, guide a man-made satellite into an orbit around our planet are applied, at the other extreme, to arm the biological professions with unprecedented instrumentalities for the pursuit of their specialized knowledge and the healing of human beings.

Anything that the human eye can see can be transmitted by television in true color. This truth has endless implications for everyone directly or indirectly engaged in the alleviation of bodily suffering.

The details of an operation or the appearance of a lesion can now be sent to any desired point for examination. Any malfunctioning area can be studied without actually visiting the patient. We can envisage a time when the individual patient, in a hospital or at home, can be viewed and advised by a physician from any distance. Microscopic slides and X-ray pictures can be studied at places remote from their physical location. Any picture in motion—let us say of an operation in progress —can be viewed directly, in normal size or greatly enlarged, at any desired point of reception.

The living record of an operation, or of the history of a medical case, can be put on magnetic color tape for leisurely viewing and study in the future. In the hospital, a skilled supervisor at a central control station can literally "see" the entire institution without moving from his seat, dispatching nurses and doctors to points where they are needed.

The nation's first assembly of closed-circuit compatible color television for hospitals and research laboratories was installed by RCA at the Walter Reed Army Medical Center in Washington. It interconnected the Armed Forces Institute of Pathology, the Army Institute of Research, and the Walter Reed Army Hospital. The benefits in efficiency, coordination, saving of time, saving of man power and other respects, I am told, are impressive.

Closed-circuit television is finding more and more employment in education. Groups and individuals all over the country can hear and view illustrated lectures simultaneously. This makes possible not only specialized instruction for medical and nursing students, but more convenient and more economical postgraduate courses for internes and refresher courses for practicing physicians.

Vital information and skills in one community have become readily available to the rest of the country. And the genius of an outstanding teacher or specialist, hitherto confined to one university or hospital, can be made accessible to interested men and women anywhere. In a period when significant new medical knowledge and techniques are constantly being unfolded, this electronic ability to disseminate them widely and rapidly should prove of inestimable value.

Electronic computers are making an ever expanding contribution to biological, medical and related sciences. Every physician, every researcher, every hospital struggles with the burden of rapidly accumulating data requiring classification, analysis and storage for instant availability for reference or study. An ever larger share of that burden is being assumed by modern electronic data-processing equipment, with tremendous economies in time and gains in precision. Electronic performance provides almost instantaneously the kind of statistical and probability findings which would, by conventional methods, have required days or weeks of tedious work.

In biological work the element of timesaving is more important than might appear at first glance. In all areas of research, what is called the lead-time gap—the interval between the discovery of a basic principle and its practical application—is unduly long. But in biological work the gap is particularly protracted, owing to the extreme complexity of biological systems and the great caution essential when human health and life are at stake. This is where the electronic worker comes increasingly to the assistance of the biologist. To begin with, speedy communication makes available to each experimenter the new knowledge of others in the field. Often needless duplication of effort is thus avoided and the pieces of an emerging puzzle are more swiftly fitted together. Beyond that, automatic analysis of masses of data sharply telescopes the time ingredient. Consider, for example, the complexity of the action of the endocrine glands. We know broadly that certain mechanisms control hormonal secretions, the effects of these hormones, and their elaborate interactions. Definitive conclusions, however, have been hampered by lack of sufficient data, speedily and accurately analyzed and reduced to dependable statistical forms. The enlistment of electronic "brains" in the enterprise obviously should shorten and sharpen the processes of inquiry.

Now that we have learned how to split the atom and how to reconstitute new atoms from old ones, or from energy itself, perhaps it is not too much

to hope that the combined efforts, knowledge and skills of biologists and electronic scientists may lead to a deeper understanding of the human cell and to the discovery of means for modifying its structure and its functions. Once this is achieved, we may find the answer to dread diseases like cancer.

The youngest of sciences, electronics, and one of the oldest, biology, are converging sciences. The very complexity of man's structure and its electrochemical aspects points up the natural relationship between them. Electronic devices have the extreme sensitivity the biologist needs when delicate structures or tenuous phenomena must be examined. They can probe deeply and delicately and provide high magnification of what the apparatus finds. Only electronics is able to deal with the ever increasing volume of data of biological structure and function.

It is dangerous to push affinities and analogies to excess. We must never forget that the stuff of life transcends, in its complexity, the most ambitious inventions man can imagine, let alone construct. Even the most elaborate man-made apparatus is primitive when matched against a living creature. The largest electronic computer, for example, may have one million storage elements, whereas the human brain has perhaps a hundred billion cells.

In any scientific endeavor, humility rather than pride is nourished by progress. For we realize that the more we learn, the more remains to be learned. Even in its most spectacular achievements, science can imitate but can never surpass the marvels of the Divine order.

It was by watching the effortless soaring of birds in the skies that Leonardo da Vinci, and experimenters after him, were emboldened to attack the problem of heavier-than-air flight. Radar is but a partial replica of the mechanisms whereby a bat finds its way in darkness past obstacles. The electronic submarine navigational equipment called sonar does not approach in perfection the means by which fish guide themselves under water. Man, in the final analysis, invents nothing that is more than a pale shadow of nature, from which he draws his inspiration and his material.

The science of cybernetics has shown that somewhat similar controls, feedbacks and methods of operation prevail in man's electronic handiwork and in man himself. It is too early to judge the ultimate meaning and utility of these affinities. It is premature, too, to speculate in any detail on what the skilled electronic designer may accomplish in the future. Suffice for our time that electronics and biology are now treading a common path of inquiry which is thrilling in its possibilities.

I have the utmost enthusiasm concerning the prospects of biology and

electronics in their collaboration for the service of mankind. I am convinced that their relationship, already so close, is destined to become closer and more fruitful with every passing year. The time may well come when science shall have fully uncovered the nature and functioning of both the energy-packed atom and its combinations on the one hand, and the living cell and its aggregations on the other. At that point knowledge of the nature of life itself—the ultimate unity under the appearances of infinite diversity—may be revealed to us.

Related to the triumphs of medicine, particularly the so-called wonder drugs, is a phenomenon with vast implications for our future. It is sometimes referred to as a population explosion. At the birth of the Christian era there were about 250 million people on earth. It took more than sixteen centuries for world population to double. But at today's rate of increase, it should double in half a century. Less than forty years ago the human race stood at two billion. Today it is nearly three billion. It is estimated that by the end of this century it will pass the five billion mark. This, as Aldous Huxley pointed out in his book, means that every four years mankind adds to its numbers the equivalent of the present population of the United States. Penicillin, DDT, purified water, the spread of elementary hygiene, the new emphasis on preventive medicine —all operate to cut down infant mortality at one end and prolong life at the other end. The growth continues to accelerate on a "compound interest" basis. Population pressures have been responsible for conflict throughout history. That they will engender more and more problems of space, food and political adjustment in the immediate future seems a certainty.

The thrust of invention and development has placed us all in an informational pressure cooker, and nowhere is this fact more clinically apparent than in the field of medicine. I am told by a doctor friend that seven out of ten prescriptions written today are for items unknown to medicine before World War II. The communications problems that result are more serious here than in any other area, since human health and life itself are involved. Viewed statistically, information covering new medical developments is contained in an estimated eight thousand medical journals and bulletins that appear annually, about half of them in the United States alone. Stretched end-to-end, their eleven million pages would extend from New York to Denver.

To keep up with developments published in medical journals, a physician would have to read the equivalent of one book every hour. This is a fundamental problem in the logistics of communications. On the one side, a mounting flow of fresh material on methods, techniques, and drugs; on the other, the harried physician to whom this information must be funneled over and around the obstacle of his rapidly diminishing time.

The communications methods standard in the world of medicine—journal articles, conventions and symposiums, medical newspapers, and

house organs—have served well in the past. But the past is not always an infallible guide to the future. Today, I find widespread agreement among my medical friends that medical science moves ahead too rapidly for the older communications techniques to cope with its advances. This was a key point in the report of the United States Senate's Special Committee of Consultants on Medical Research, on which I was privileged to serve. The committee's report said in part: "The enormous problems of handling the rapidly increasing flow of new information in the literature, of codifying it, and making it readily accessible, urgently cry out for solution."

RCA has done exploratory work in the area of communications in medicine. We are convinced, on the basis of intensive studies, that radio can be an effective method of keeping the doctor better informed about significant developments in medicine.

It is possible to set up a closed-circuit radio network that would link two hundred thousand doctors' offices, hospitals, and medical schools in the principal metropolitan centers of the United States. At specified times during the day, this network could carry medical news, reports of scientific assemblies, discussions of medical economics, and medico-legal topics, and reports on research activities. In short, it could be a comprehensive medical journal of the air, with the scientific integrity of its program content insured by an Editorial Advisory Council serving as both a source of material and a critic of scripts.

A private medical network is possible through the imaginative use of what is known as FM multiplexing. This form of communications permits two or more programs to be sent by the same transmitter along the same frequency. In principle, a multiplex system is not dissimilar to the message-carrying complex within the human being where trillions of interconnected cells coordinate messages traveling from one part of the body to another. The multiplex signal could be heard only by those receivers designed for and tuned to the frequency of the network station. It is thus possible to crossbreed a mass communications technique with the privacy of a telephone line.

For the doctor, a multiplex system would: Sharply reduce lag time between the scientist's laboratory discovery and its bedside application; provide postgraduate medical courses by a faculty of the nation's foremost specialists; provide up-to-the-minute news on significant developments across the entire spectrum of medical science; remove the specialist from the isolation to which the pressures of current medical practice drive him, and give him awareness of developments in all medical fields.

A multiplex system radio network would give the doctor more information more quickly and more conveniently than any other means. In his

own office, with no more than fifty or sixty minutes of daily listening, he could stay abreast of the unending march of medical advance.

A broad informational use of television comes through films made of live color programs and furnished to Army doctors stationed at remote posts around the world. Any military installation with a standard motion picture projector can take advantage of lectures, demonstrations and courses given by specialists at the Walter Reed Army Medical Center.

Eventually, lectures and demonstrations by front-rank specialists will be available to every physician in his own office. A compact, inexpensive television-tape player, now under development, will reproduce television pictures and sound from magnetic tape over any television receiver. When the player reaches the market, taped versions of refresher courses will be mailed the physician to play through his own television set at his convenience.

In terms of international communications, man-made satellites can serve as relays for world-wide medical television. Such a system would permit round-table discussions between medical experts anywhere on the globe. It could bring together scientists, teachers, demonstrators and students into one vast audience—truly a medical school of the world. And through instantaneous electronic translation techniques, which are now in development, the barrier of language differences—as real to the doctor as to the statesman—will be finally surmounted.

Every physician, every medical researcher, every hospital struggles today with mountains of data requiring classification, analysis, and storage for immediate retrieval. More and more of that burden can be shifted to modern electronic data processing equipment, with tremendous economies in time and gains in precision. Electronic performance provides in seconds the kind of statistical and probability findings that, with conventional methods, takes days or even weeks of onerous work.

No single requirement is more fundamental to the research scientist than knowing what has been done in his immediate area and in related areas. Lacking this knowledge, he can grope aimlessly, duplicating the work of others to a wasteful extent. In industry, such duplication costs an estimated billion dollars a year, and the toll is comparable in other fields.

Medical knowledge is increasing so rapidly that it has far outstripped the storage capacity of any single human brain. But computers enable us to store accumulated knowledge compactly, update it continuously, recall it instantly.

Through a blend of electronic computation and communication tech-

niques, it would be possible to establish a national medical clearinghouse which could serve as a central repository for all the latest medical information. By a combination of communications circuits, every major hospital and medical school in the country could be tied into this clearinghouse. If a doctor sought the source of information on a particular subject, he would simply dial a number. Instantly, a relevant bibliography would flash on a televisionlike screen before him. Then, when he made his choice of a particular article, he could dial again and get a microfilm version of the article on his screen.

A service of great value to the physician would be rapid access to the medical history of any person seeking treatment. Now, the relevant data are so scattered in doctors' offices, hospitals, insurance company files and elsewhere that an individual's medical background has to be re-established on every occasion through time-consuming questioning and examination. With a centralized electronic file of health records, the physician could simply dial the identifying code number of his patient and obtain an up-to-date report.

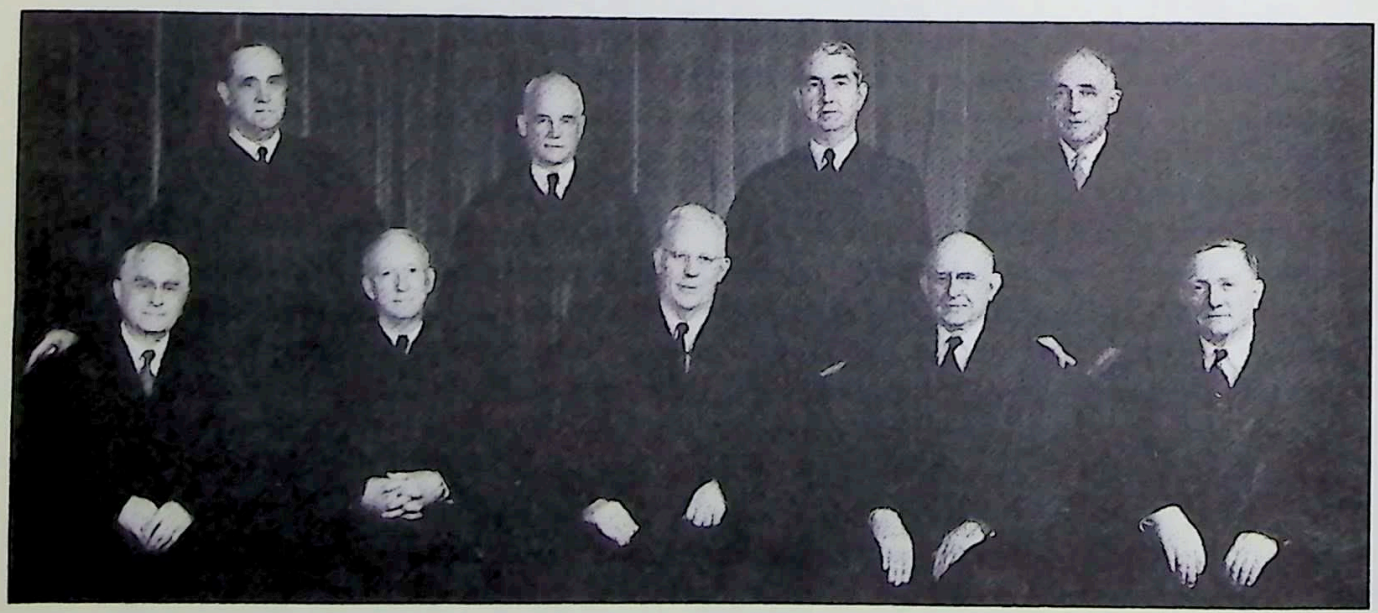
To the leaders of the medical profession, I would like to offer the suggestion that the American Medical Association, in concert with representatives of the electronics industry, create a joint group to consider the feasibility of a national medical clearinghouse; and if it is deemed feasible, to decide the soundest way of bringing it to fruition. In such a venture, I am certain that the electronics industry would cooperate wholeheartedly. Speaking for my own organization, our experts, experienced in many fields of communications, would be pleased to assist such a group in its studies. I realize, of course, that there are numerous details to be analyzed in any proposal of such magnitude. But I trust that the concept itself has sufficient promise to justify its careful pursuit. There is no technical reason why a medical clearinghouse, once established on a national scale, could not be expanded gradually to embrace the entire world.

*Dr. Paul Dudley White, one of the world's most famous heart specialists and an eminent recipient of the Wisdom Award of Honor, reading the special edition of Wisdom Magazine which was devoted to his wisdom and published in tribute to his distinguished achievements in medicine. When Dr. White appeared on the NBC-Television Wisdom Series, this internationally known physician told why he made medicine his career and revealed his reasons for specializing in heart diseases. He discussed arteriosclerosis and other diseases of the heart and arteries, and related the increase in heart disease to our modern way of life.*

There are creators of ideas and creative translators of ideas into the habits and institutions of society. At their highest the two functions are seldom, if ever, combined in a single person. David Sarnoff's greatness lies in the fact that he has properly absorbed the spirit of his age and has endeavored to abide by the fundamental laws of development as revealed by the progress of science and by the history of society. This intellectual attitude has enabled him to respond to the exigencies of the revolutionary forces of our era, namely, science, and the struggle for peace and security. As a creator of ideas, and a creative translator of ideas, he is able to grasp clearly the working of the main forces which join human history to the existence of the universe.

Felix Frankfurter

FELIX FRANKFURTER
*Associate Justice of the Supreme Court*



*Felix Frankfurter (seated at extreme left) was appointed Associate Justice of the Supreme Court by President Franklin D. Roosevelt in 1939, where he served until 1962. An eminent recipient of the Wisdom Award of Honor, Frankfurter was one of the notable Americans who inspired and encouraged the creation and publication of Wisdom Magazine. A special edition devoted to his wisdom was published in tribute to his distinguished achievements in law, government and education.*

# THE WISDOM OF SARNOFF ON *Law*

In my youth I had a strong desire to become a lawyer. The Fates decided otherwise. They turned me first into a wireless telegraph operator and later into a business executive which inevitably resulted in my becoming a client. Over nearly half a century, I have, in that capacity, received a fairly extensive and certainly expensive legal education.

Whatever faults there may be in its detail, the law is a magnificent edifice in the aggregate. The ideals embodied in law as administered by our courts constitute the framework of our whole civilization. Today, that civilization faces the mortal challenge of a powerful and dynamic ideology contemptuous of law and justice. Understanding and defense of our courts have, therefore, become the obligation not alone of those professionally concerned with them, but of every layman as well.

The overriding reality of the present period is the struggle between democratic freedom and totalitarian despotism. Outwardly the contest is between two opposed economic and political systems, but at its core it is a conflict between two irreconcilable moral systems.

We learned the Golden Rule at our mothers' knees. Today the Golden Rule must contend with the Iron Rule of the superstate. In a sinister directive laid down to his disciples, Lenin said: "It is necessary to use every ruse, cunning, unlawful method, evasion, concealment of the truth." This is the code of the criminal underworld. It has already been imposed on a third of the human race. Now it seeks to engulf the rest of mankind.

In our judicial philosophy, rooted in Roman Law and English Common Law, drawing its living sap from Judeo-Christian ethics, the law is superior to the government; the courts are designed to protect the rights and property of the individual against the power of the State. But under the totalitarian concept, whether Fascist or Communist, the state stands above the law. What they call law amounts to merely a codification of the imperious will of the dictators. Their courts are no more than tools for crushing the rights of the individual and exalting the power of the State. Contrast this with the statement of Chief Justice Earl Warren who touched the heart of the matter when he wrote that "our legal system is woven around the freedom and the dignity of the individual."

The immense distance between the two sets of moral and legal concepts is also a measure of our responsibility in meeting their challenge. The values embraced by our laws and shielded by our courts are at once symbol and substance of our ethical heritage. Never before has it been so openly menaced. Never before, therefore, has it had so great and urgent a claim on our loyalty. This, however, does not imply blind acceptance of our own judicial structure and procedures. On the contrary, it calls for open-minded dedication to continuous improvement. It is a sign not of weakness but of strength that we can acknowledge shortcomings and direct ourselves to their elimination.

Our law is the result of organic growth through centuries, and that has meant a constant adjustment to changing environment. But the moral principles on which our system of justice is based are eternal. No man-made moon or death-dealing missile can affect the validity of the Ten Commandments, the Magna Charta, the Bill of Rights, and other repositories of the ethical wisdom constituting our heritage as free men.

It is all to the good that our courts resist the fashions and passions of the hour. The hallmarks of law under freedom are its stability and dependability. These enable the honest citizen to perform his part in organized society, to plan ahead in his private and economic life, with the necessary confidence that the rules of the game will not be arbitrarily changed in mid-play.

The rapid march of science and technology, during the last fifty years, however, brought an enormous increase in the complexity and scale of our economic structure. In business, this has resulted in a managerial revolution to secure more factual information on which to base its decisions, higher efficiency and swifter action. The impact of these developments and the tempo of our times have, in turn, placed new and heavy burdens upon the courts.

It is not in a critical spirit that I take the liberty of touching on aspects of the administration of justice which are of particular importance to the business community. We are familiar with the classic remark attributed to Solon, the ancient law-giver. Asked how justice could be made secure in Athens, he replied: "If those who are not injured feel as indignant as those who are." In our highly interdependent American society, hardships and inequities visited upon anyone must in the long run hurt everyone.

We all agree that the law, in relation to our free economy, is designed to protect the freedom of all people to create, to achieve, to compete. I believe that on the whole it does so. Yet it has seemed to me, and to many other business executives, that at times this protection leads to quite contrary results. I have in mind, for example, trends in the antitrust field, where conspicuous achievement in the competitive economy too often becomes suspect. Court decisions have on occasion resulted in giving a substantial part of the harvest reaped to those who have evaded the labors and hazards of sowing.

The growing uncertainties as to the legal position of a successful company, especially if it pioneered new products, new services and even new industries, naturally has disturbed many business executives.

It is still exceedingly difficult to know what rules of the game a court may apply a few years later to the game being played now. I feel there

is a pressing need for the clarification of laws relating to the conduct of business. The responsible executive ought at least to know that what is legitimate enterprise today will not be adjudged illegal tomorrow.

Only a resurgence of the rule of reason can arrest the growing confusion. In most of the other areas of human conduct, people can ascertain with assurance whether something they propose to do is within the bounds of legality. Why not in the antitrust area? Is not business entitled to be protected by the same rationale which protects the public from *ex post facto* laws?

From my vantage point as a layman, I respectfully submit that there is need for analysis, thorough and critical, of the effects of business practices which may be challenged retroactively on one or another theoretical basis. But nowhere in government, so far as I know, is there an agency, independent of the enforcement agencies, equipped and empowered to furnish such an impartial judgment before issues are unloaded on the overburdened courts. Such an analysis, it seems to me, should be a prerequisite to the commencement of antitrust proceedings attacking business practices whether initiated by the Federal Trade Commission, the Department of Justice, or any other agency of government.

In the absence of some more effective proposal, I would recommend the creation of an official Bureau of Economic Intelligence, possessing adequate powers, personnel and facilities to supply expert and impartial analyses of business practices and their economic effects upon industry and the public. Both the courts and the companies would be greatly benefited if arbitrary conjecture were thus displaced by authoritative opinion.

An immense amount of effort, money and time could be saved for all concerned if it were possible for executives to obtain definitive and enduring legal advisory opinions from an appropriate government agency before they embark on some course of conduct. Only in that way could they be reasonably protected against the demoralizing fear that the rules will be switched years later by some official taking a contrary view of the law.

One of the most common causes of calendar congestion in our Federal courts is the large antitrust litigation which ties up a judge in an overworked and undermanned court for months and sometimes for years. A good deal of this, it seems to me, could be avoided by the creation of a Bureau of Economic Intelligence; for the practices later complained of could be avoided in the first instance.

I believe that the burden of Government litigation could be substantially reduced, if the existing agencies charged with antitrust enforcement

consulted with business, in advance of commencing litigation, and indicated the specific practices to which they object. This would provide a method of obtaining compliance with the law by means of agreement to correct offending practices before any complaint is filed. In some cases litigation might thus be completely avoided. Where the Government deemed filing of a complaint necessary, it could be accompanied by simultaneous entry of a consent decree. In either event the result would be to lessen the load on the courts. I am informed that the Government already has taken some steps along these lines but in my opinion it should go further in exploring this field.

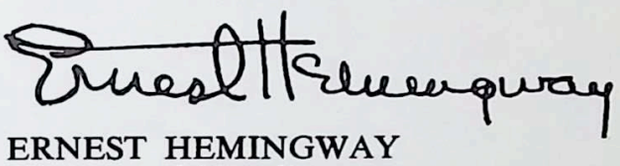
A type of so-called "big case" which weighs heavily on the business community and the courts alike is private litigation in the antitrust field. Here administrative reforms and controls seem desirable. I understand that, in general, there is no restraint on anyone who chooses to commence a private antitrust action, regardless of its merits. The plaintiff need not possess any substantial factual evidence. He can go fishing for it at the defendants' expense and time. Under the present system he files a complaint, then invokes the almost boundless "discovery" techniques.

A distinguished Federal judge of New York, Irving R. Kaufman, once spoke of "a few attorneys who, unfortunately, insist on interpreting freedom from picayune restriction as license for harassment." And their preferred field of operations, he said, is that of "discovery" proceedings. In referring to the enormous costs of discovery proceedings in the antitrust field Judge Kaufman said: "What makes these astronomical expenses even more appalling is the fact that in so many of these cases the percentage of useful information uncovered is so minute. The best estimates are that less than ten percent of all the material contained in these voluminous depositions is useful at the trial."

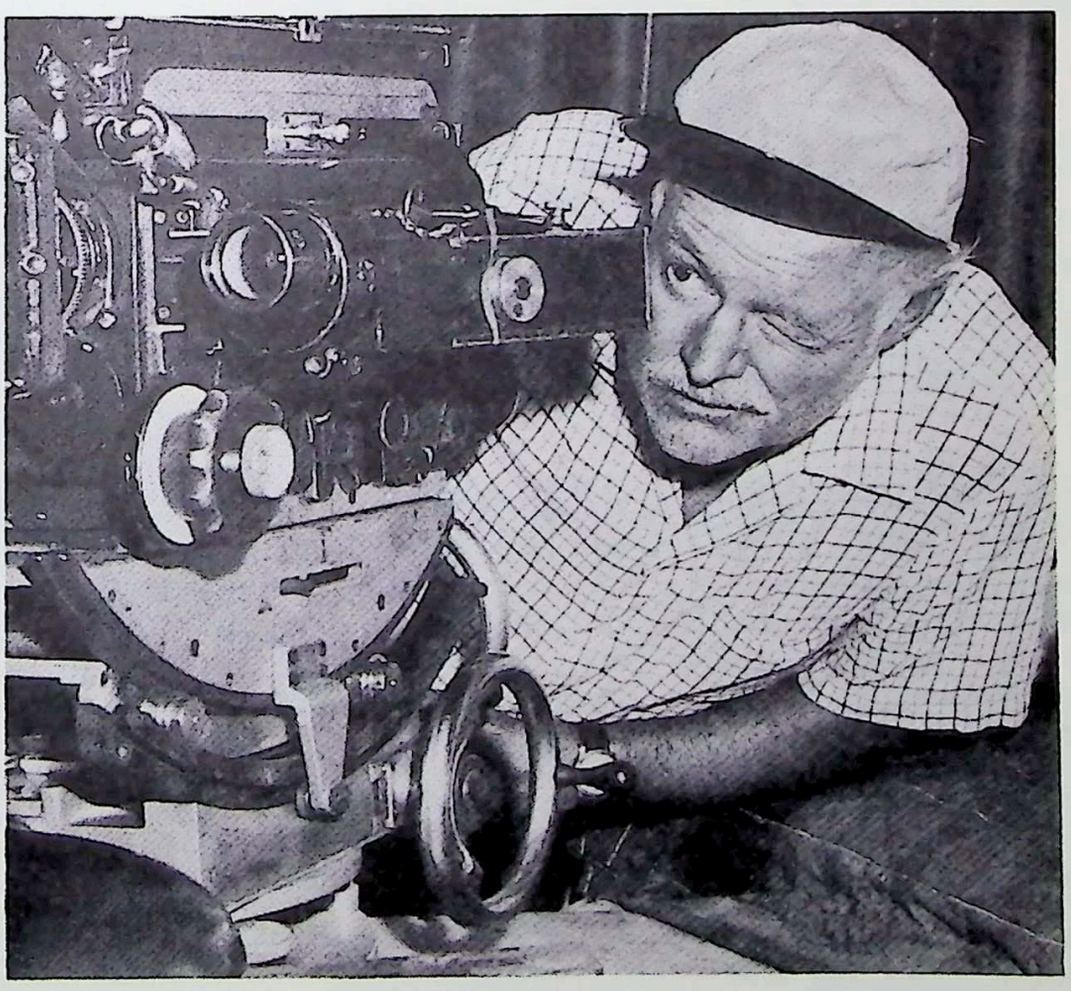
Business executives recognize that private antitrust actions are an inevitable consequence of the antitrust laws. Many have found, however, that present procedures put a staggering and unwarranted burden on the companies and the courts involved. They contend that unlimited discovery is a bonanza for nuisance artists. They point out that companies are often forced to choose between principled defense of their position and expedient time and money-saving settlements.

Most judges and lawyers, I am told, favor one method for curbing abuses of discovery. It is the assignment of a "big case," such as an antitrust action, to one judge early in the proceedings. That one judge would thereafter supervise the limitation of the issues in the case and control the scope of discovery proceedings. Unfortunately this is not always practicable in districts where the dockets are heavily loaded down with "big cases" and many thousands of smaller cases. There is the ever present risk that the smaller cases will be blocked from trial by any preferential handling of the "big cases." A more drastic remedy has been suggested. I must confess that it makes a strong practical appeal to the

Success is not measured by what a man accomplishes, but by the opposition he has encountered and the courage with which he has maintained the struggle against overwhelming odds. If there is one thing upon this earth that mankind loves and admires, it is a courageous man—a man like David Sarnoff—a brave, bold, true, resolute man who has conquered monumental difficulties by daring to attempt them. Through his electronic achievements in radio and television, he has made a permanent addition to the highest literature of the human race. He has earned the world's tribute and more than deserves the praise that it has lavished upon him, for he is a benefactor to all the world. It is his fate to come within the sight of the Land of Immortality and yet be fortunate to one day enter its bounds.



ERNEST HEMINGWAY
*Author and Novelist*



*One of the most widely acclaimed documentaries every produced by NBC-Television was the memorable "Portrait of Hemingway," which was seen by one of the largest audiences in television history. An eminent recipient of the Wisdom Award of Honor, Hemingway collaborated with the Editors of Wisdom Magazine on a special edition which was devoted to his wisdom and published in tribute to his distinguished achievements in American literature.*

mind of a businessman. Why not borrow the practice, which I understand the British follow, of requiring an unsuccessful litigant to pay the court costs and counsel fees incurred by his successful adversary? Besides acting as a deterrent to unwarranted suits, it would encourage more frequent and more effective defense in such cases, and thus cut the ground from under the nuisance artists.

Court reviews of administrative decisions is a thorny problem. Frequently judges are called upon to rule on difficult technical, scientific and other specialized issues. Increasingly they simply defer to the judgment of the administrators, on the ground that the agency in question was created to deal expertly with problems in its field.

I do not question the necessity of easing the strain on our overburdened judicial machine by resort to administrative process, nor the right of a court to circumscribe that which it will consent to hear. But I suggest that the rising tide of judicial reluctance to review administrative decisions may have serious and far-reaching implications for business and the public.

The administrative agencies deal with great issues and have great power. Many key industries—railroads, communications, public utilities, to mention a few—are subject to the decisions of such agencies. Not all of the commissioners wielding this crucial power possess special expertise at the time of their appointment. And relatively few remain in office long enough to acquire it. Yet the effects of their rulings are sometimes as far-reaching as some Supreme Court decisions. And to the business enterprises involved they can be matters of life or death.

I suggest the desirability of making available to the courts, both at the trial and appellate levels, qualified and impartial experts for purposes of consultation. In the economic field, for example, such experts could help judges dealing with complex economic issues in large antitrust suits. They could be useful in the patent field, where the courts so often face recondite technical problems. Moreover, on agency decisions the court would have specialized guidance to determine in a given matter the extent to which the expertise of a particular agency should be reviewed.

No executive in private enterprise would tolerate a work-load as unreasonable as the majority of judges now carry. In the interests of efficiency, if nothing else, his corporation would act to solve the problem. It seems to me clear that the courts, with the active collaboration of lawyers and laymen, can do no less. In their case the "corporation" is the entire citizenry.

I believe there is pressing need for more judges. Not long ago the Judicial Conference of the United States and the Executive Committee of the

Attorney General's Conference on Court Congestion and Delay in Litigation recommended the appointment of forty-five additional Federal judges. The Director of the Administrative Office of the United States Courts has said "It is of the greatest importance that these recommendations receive prompt consideration from Congress." It seems to me incumbent upon every public-spirited layman to urge favorable action without delay upon his Senators and Congressmen. It is a truism that "justice delayed is justice denied." Legal relief, like medical relief, is not much use if the patient dies before it arrives. The basic answer to the evil of delay is enough judges on every level of the judicial process.

Judges must be given more adequate assistance. There is no doubt that judges lack such professional, clerical and mechanical assistance as would be supplied as a matter of course to a business executive having comparable responsibilities. In examining the late Chief Justice Vanderbilt's fine book, *The Challenge of Law Reform,* I came upon the following illuminating facts: "The number of reported American decisions today has been estimated at 2,100,000, a number to be compared with the 5000 cases available to Coke and Bacon in 1600, and the 10,000 decisions to be found in the books at the time of Mansfield and Blackstone 150 years later. What is more, the number of American decisions is increasing at the rate of 22,000 a month."

Even a layman can recognize the problems posed by proliferation of the Common Law. There is also the ever expanding flood of laws enacted by Congress and State Legislatures. It is easy to grasp Chief Justice Vanderbilt's statement that "It takes two or three times longer today to uncover the law on a given point than it did twenty-five years ago." If anything is obvious it is that the courts must have more assistance.

Why should not the courts make larger use of the mechanical aids now in common use in business? Such things as microfilm for preservation of records; automatic business machinery for statistical purposes; tape-recorders and other modern devices for taking down dictation and oral testimony could all be utilized.

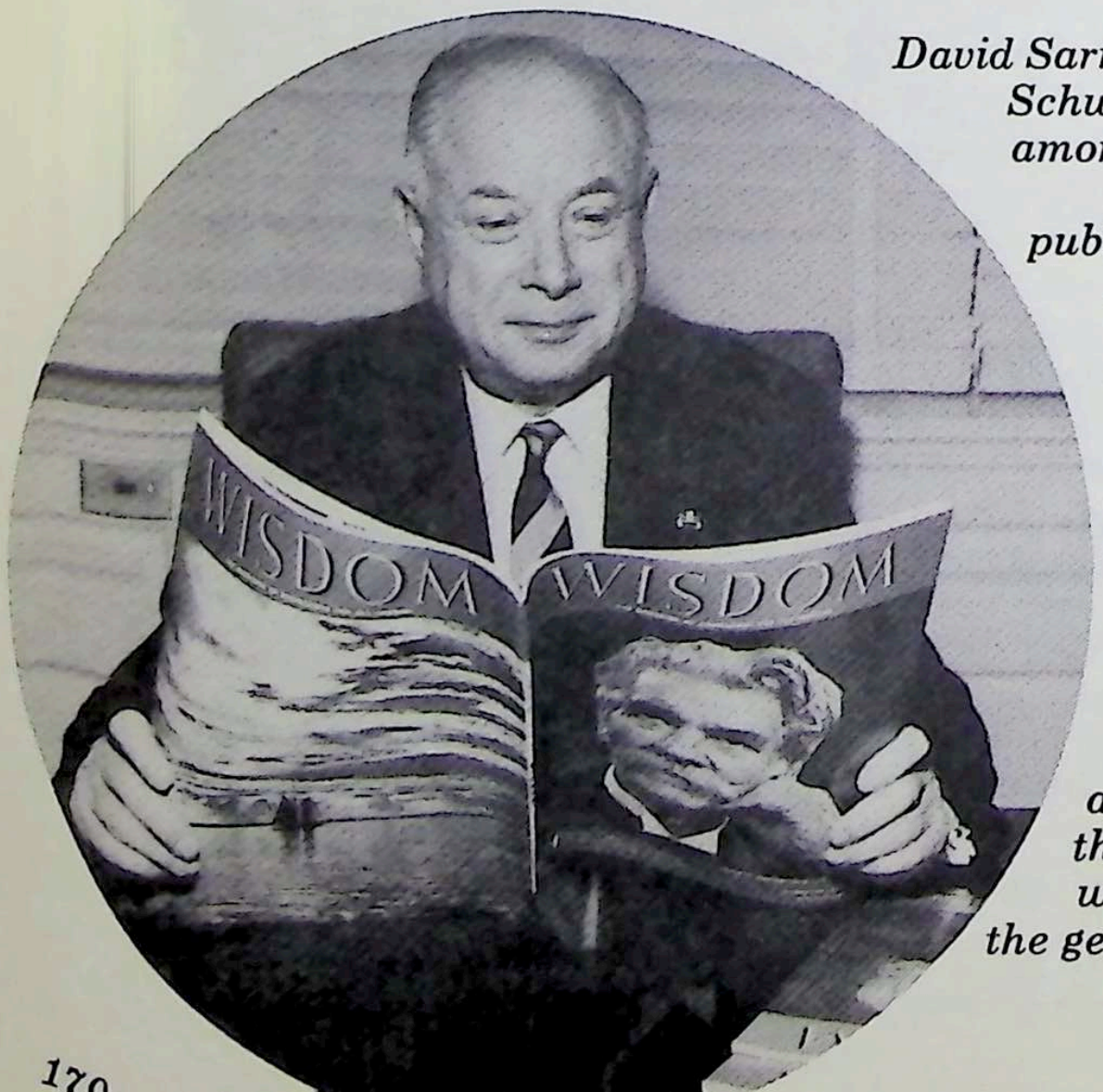
Expert technical personnel should be placed at the disposal of the courts. The character of litigation of necessity reflects the changing character of a society. Ours is continually becoming more technical. It is unreasonable to expect every judge to be his own expert on the manifold complexities brought to his bench.

The physical facilities of our courts must be enlarged and improved. The crowded courtroom, the antiquated courthouse, the musty atmosphere in many a judicial chamber accord with neither the dignity nor the efficiency of the administration of justice. Only a bare beginning has been made, for example, in air-conditioning courthouses—something that the smallest business plant is likely to provide nowadays.

A nationwide program for new courthouses may be too ambitious. But some new construction and essential modernization should no longer be postponed. And proper housing for the Goddess of Justice is just as important to the litigants, the jurymen, the witnesses and the public as it is to the judges. The improvement of physical facilities clearly is an area where the understanding and support of the ordinary citizen is indispensable, where his active cooperation can make a genuine contribution to better administration of justice.

Judicial salaries must be brought into line with today's economic facts of life. This is a delicate subject, but as realists we cannot evade it. It is my considered opinion, based on long personal observation of the work and responsibilities of judges, that their compensation compares unfavorably with that of business executives of comparable status. The same applies to the compensation of their staffs. I am aware that judicial salaries have been somewhat increased in recent years. But the increases have kept pace neither with the rise of living costs nor the colossal growth of the judicial work-load. It is obviously of paramount importance that the high calling continue to attract the kind of superior men whom we all wish to see on the bench. The honor attached to a judgeship is a tremendous incentive, but honor is not legal tender in paying rent, buying groceries and meeting other obligations to one's family.

Laymen can play a significant role in improving the administration of justice. To put the matter in practical terms, laymen are in a position to help create the proper climate of public opinion for legislative action where such action is necessary. Understandably, the inertia of habit is involved and tends to retard progress. The more forthright intervention of dedicated laymen can help immeasurably to remove misunderstandings and break down obstructions.




*David Sarnoff, shown reading the Albert Schweitzer edition of Wisdom, was among the first notable Americans to encourage the creation and publication of Wisdom Magazine. A special edition, on which he collaborated with the Editors of Wisdom, was devoted to his wisdom and published in tribute to his many brilliant achievements in communications, radio, television, electronics and scientific research. When the Wisdom Award of Honor was conferred upon Sarnoff, an eminent educator remarked that "no country in the civilized world has failed to benefit from the genius and industry of Sarnoff."*

# THE WISDOM OF SARNOFF ON *Religion*

The will of God is a concept which depends on one's faith. If you believe in God, and I do, you have to assume that there is a will on His part and that that will is that certain things should be done. Man should do certain things for himself and not depend entirely on God to do everything for him. If you feel the whole purpose of God is to serve you, you are going to be disappointed. Men are happier if they believe that there is a Supreme Being who has a purpose in creation which we do not know and do not understand. One of the interesting things about life is the challenge to pursue the truth.

Without faith very little can be accomplished, and with it mountains can be moved. By faith I mean belief in God and belief in oneself and belief in mankind.

I cannot believe that God expects us to worship him at particular hours of the day or night or in a particular form. I think that prayer is not something we ought to do for the benefit of God but for ourselves if it benefits us. A temple or church is only to create atmosphere—if you can walk into any place and take off your street garments mentally and can contemplate and think in terms that have nothing to do with the outer world, and if that gives you satisfaction, then I think it is fine and is in itself a form of prayer. Places of worship readily furnish that atmosphere; therefore they are good.

It was the prophet, Isaiah, who spoke of "beating swords into plowshares and spears into pruning hooks." It was he who dreamed of a time when every man would sit under his own vine and fig tree with none to make him afraid. But today, unhappily, the dream of Isaiah remains only a dream. And fear casts its brooding presence over the planet of man. Never before has humanity had such compelling need for spiritual guidance and insight. Yet, we see it denied in one-third of the globe, and threatened in the remainder by an implacable adversary who seeks the total destruction of the cherished Judeo-Christian concept of civilization.

The lethal contest between Communism and Freedom is often evaluated only in a military, political and economic context. Yet, its challenge is pre-eminently moral. Let there be no doubt that man's soul itself is deeply involved in the dominant conflict of our age. Confronted with this challenge, too many, I fear, have accepted the soothing fallacy that Good and Evil can be mixed in the same recipe and thus made palatable. History is our warrant that enduring peace cannot be purchased with the coin of expediency. The bargain at Munich was praised by many in its day as "realism." Yet, it brought not peace but world carnage.

More than anything else today, we need a reawakened awareness of the true purpose of life—and a militant faith in defending it. We must cling more resolutely than ever to the fundamental values that are so gravely menaced. We must never concede that these values are expendable or

that they can safely be diluted. If we do, we shall be riding the boulevard of total defeat. And it will matter little whether that defeat is imposed by a pagan force from outside or by demoralization from within.

Military weapons alone are not enough unless they are reinforced with the hardware of the spirit. For truth, justice, freedom, loyalty—these are still the ultimate weapons. Nothing that science can devise will ever supersede them. Today, when there is no longer any safe retreat, all of us must go forward, with steady step and firm purpose worthy of our great past. An Eleventh Century Jewish poet and philosopher, Ibn Gabirol, wrote: "I went to the rear to preserve my life, but I found that I could not preserve my life unless I went forward." Let us remember that the struggle for liberty and religious freedom is not new to man. In meeting the challenge we face in our lifetime, we must not allow the stormy winds of dictatorship and tyranny to extinguish the shining lights of freedom. Let us hope that our march will lead us to a meaningful and enduring peace.

What is it that we must defend with our lives? Certainly not material possessions alone. In a fundamental sense it is the right to hold to a deeper purpose to life. To know and respect the sacredness of the human soul. To preserve our individual dignity. To uphold our passion for truth and justice. To preserve our sense of compassion toward our fellow men. We defend the Commandments handed down from Sinai and the Sermon on the Mount—the heritage of our forebears and the posterity of our children. Without the shield and buckler of these hallowed ideals we are indeed naked before ourselves, our enemy, and our God.

When the lights of peace have been snuffed out and nations have gone on the march, churches and synagogues on both sides have been with the faithful, speaking in different tongues but uttering the same prayers for salvation and victory. In our own country this spiritual dilemma reached its sad climax a century ago, in the Civil War, when brother prayed as well as fought against brother. Today, we are spared any probability of reliving this emotional conflict. For our present adversaries have renounced the Creator. They have ruthlessly set out to destroy every religious instinct in their own people and others, recognizing that the doctrines of God and their own implacable dogma of man as the servile tool of the State are utterly incompatible. Military conflict is no more palatable because of this. But there are no shadings of spiritual doubt. Either our ideals will prevail—or theirs. Either God will reign—or the godless and soulless State.

It is impossible to conceive either of liberty or democracy without a religious foundation. "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable rights." This is perhaps the noblest expression of religious feeling ever formulated in a political document. And it is our primary task, it seems to me, to help preserve this unbreakable bond between the

*Motion Picture Producer Director Cecil B. DeMille directing "The Ten Commandments." Charlton Heston, who played the role of Moses, stands in the background.*

I have had for many years the greatest admiration for David Sarnoff, not only on account of the great pioneering work that he has done in the fields of radio, television and electronics, but also, and probably more so, because I respect him as a man of purpose and vision, of courage and determination, and one genuinely dedicated to the cause of democracy in truest American tradition.

Cecil B. DeMille

CECIL B. DEMILLE
*Motion Picture Director and Producer*

words of man and the Word of God, as vouchsafed in the Declaration of Independence.

Millions—either directly or through Christianity—are conditioned by the Hebrew Scriptures and the literature based upon it. Can it be entirely accident that a people who make up only one-half of one per cent of the human race should have made such an impact upon world civilization? How are we to grasp this phenomenon of the colossal influence of a numerically tiny race throughout history—except by research-in-depth into Judaism? Quite aside from the inherent beauty of the Prophetic and Talmudic word, it is an intellectually compelling field of study.

Rarely before has mankind had such urgent need for the guidance and healment of spiritual insights, because rarely before has man been so confused and frightened. Where the ancient Greeks were preoccupied with esthetics, the Jews were deeply concerned with ethics—with the Divine spark in mortal man. Because of their genius for moral law, Palestine was the seed-bed of great religions.

Surely in this time of so much moral ambiguity, so much erosion of ethical values, we would do well to return to first principles in the domain of conduct. Modern man has been trapped in a maze of communist amoralism, Nietzschean nihilism, and materialist obsessions. He seems to have lost his ethical compass. Under his confusions there is a positive nostalgia for those simple, clear-cut moral certitudes that have always been basic in the Hebraic philosophy of life.

We live in the midst of a great crisis, in which our whole Judeo-Christian civilization is at stake. The Communist adversary, pledged to destroy all we hold most precious, has overrun a third of the human race and reaches out greedily for the other two-thirds. In this predicament, I believe, we must cling more resolutely than ever to the fundamental values being menaced. We dare not concede that these values are expendable or can be safely watered down. If we do, we shall be on the high road to total defeat. And it will matter little whether the defeat is imposed by brute force or by demoralization from within.

It has been the weakening of moral frontiers, more than anything else, that opened easy roads for conquest to the totalitarian monstrosities of this half-century. Our most vital task, therefore, is to repair the dividing line between Good and Evil, between right and wrong, and restore the basic moral imperatives. Unless that is done, we shall continue to appease Evil in the name of shabby expediencies that bring us only temporary illusions of peace.

Too many in our generation have made Pilate's cynical question, "What is truth?" an alibi for ugly falsehoods. They proclaim that morality is at

best a relative thing, and bid us to "understand" the devil. Too many have accepted the pernicious fallacy that Good and Evil can be averaged up; that wisdom consists of splitting the difference between decency and depravity. But this middle-of-the-road logic, when applied to moral questions, undermines integrity and in the end makes us bed-fellows of despots and arch-criminals.

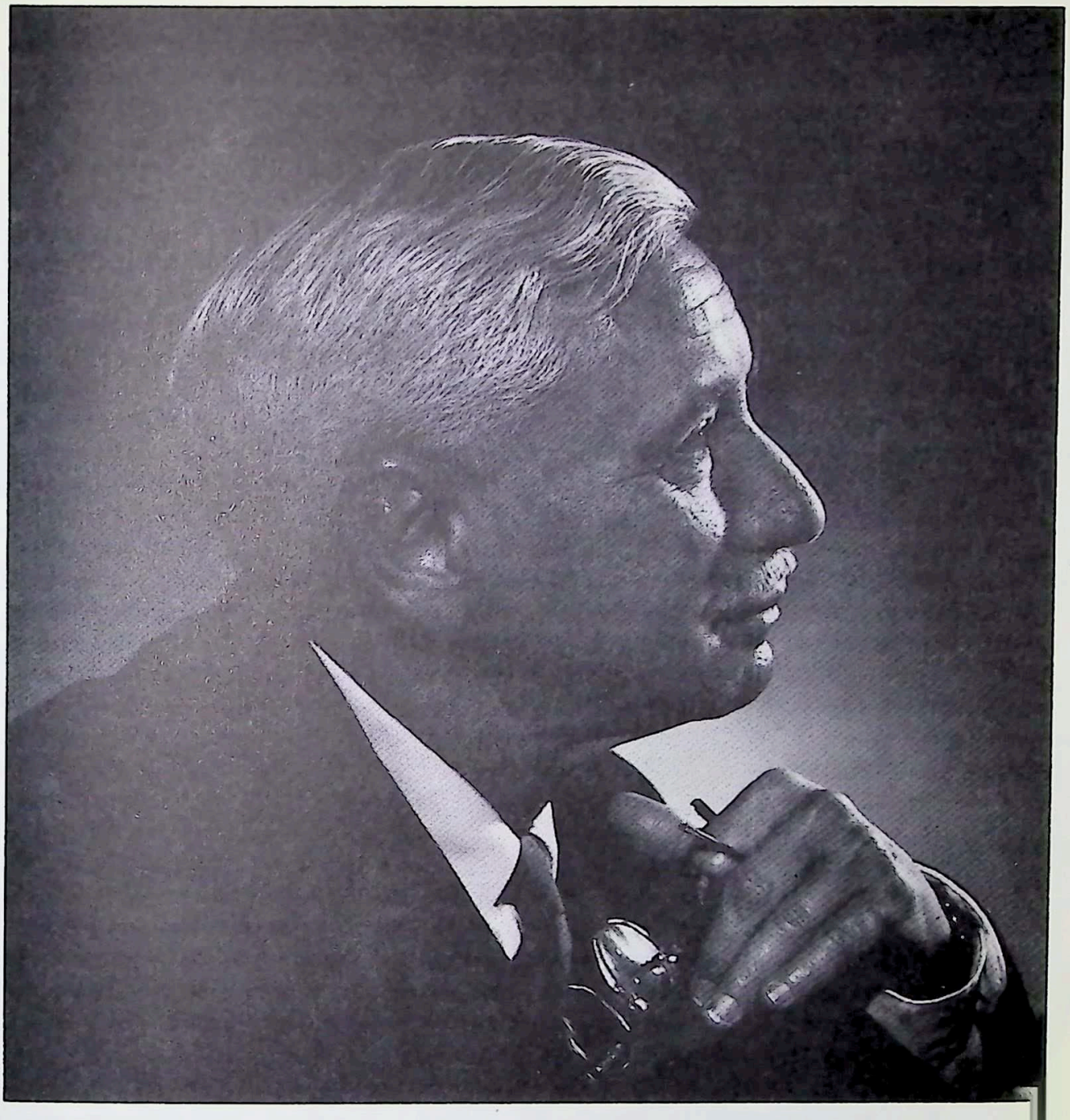
Few men have lost moral sensitivity to the point where they could look upon the murder of a friend or a neighbor and say, "Oh well, maybe there's another side to it. Let's wait for the verdict of history." Yet the same men find it possible to look with a certain complacency upon the murder of millions in concentration camps.

People who have lost their faith in moral truth have also lost the capacity for righteous indignation in the face of hideous crimes. And all of this gives the right of way to the new barbarians behind the Iron Curtains who oppress their own people and menace the rest of us.

The great Prophets and Teachers were stubborn and uncompromising on essential principles. Where age-old truths were at stake, they never sought safety in the middle ground of compromise. They did not countenance the modern heresy of tolerance of the intolerable.

More than anything else mankind needs today a consistent view of the good society and the good life—and the courage stoutly to defend it. That view is not to be found in the sophistications of those who sneer at moral values. It resides in the total experience of the human race, as expressed in its noblest literature and moral systems.

*Cecil B. DeMille, the greatest producer and director in the history of motion pictures and an eminent recipient of the Wisdom Award of Honor, reading the special edition of Wisdom Magazine on which he collaborated with the Editors of Wisdom. It was devoted to his wisdom and published in tribute to his distinguished achievements in motion pictures. DeMille's spectacular productions of "King of Kings," "Samson and Delilah," "The Ten Commandments," and other biographical and historical films, are destined to live forever on the screen.*

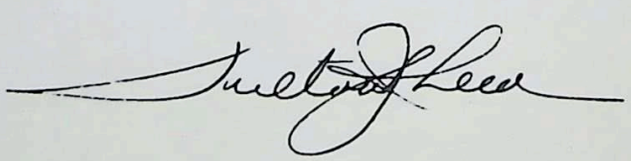


It is impossible to attempt an enumeration of the incalculable and immeasurable activities and wonderful accomplishments of David Sarnoff's life. For many years, the people of our country have recognized in him the master spirit of radio, television and electronics. To him have been yielded the rich rewards, honors and tributes which the world always has for the man who contributes to its well-being. For General Sarnoff is one of the world's truly great men—a brilliant man and a profoundly wise one—whose efforts are directed toward making the world better. Building on what already existed, he flashed the light of genius into the shadows of unexplored scientific possibilities. His gifts to the world stand ready today to make life easier, happier, better. We should present this lover of mankind with the laurels of our esteem, and the grateful appreciation of a nation and a people conscious of the service that has been rendered to us. David Sarnoff has engraved his name deep in the marble of the ages.

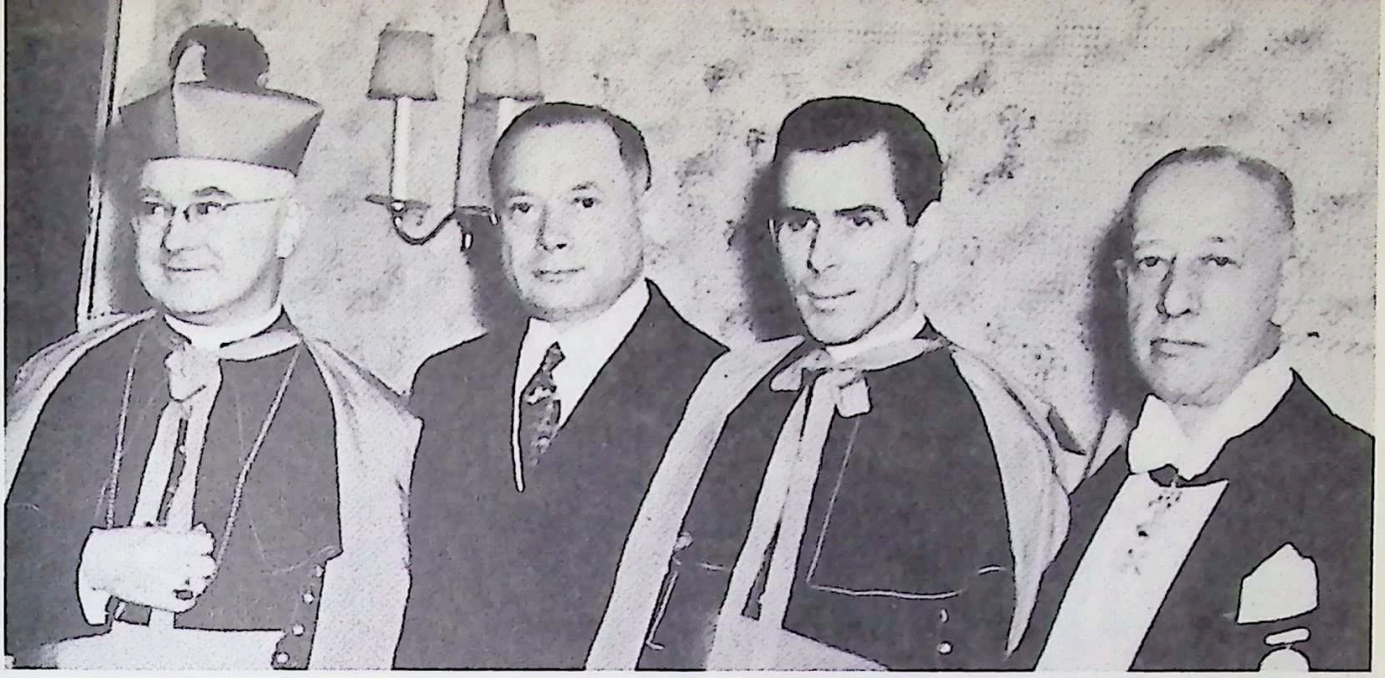
Will Durant

WILL DURANT
*Author, Philosopher and Historian*

Some men are born, live and die without materially affecting anything more than the small circle of people immediately surrounding them. Other men, with no better opportunities, exert an influence that is ever widening until countless multitudes are molded in character, life, purpose, and efficiency for good—not for a single generation only, but for all time to come. Such a man is David Sarnoff. He has used all the influence and power which his achievements have brought him for the single purpose of furthering the work to which he has devoted his life—the betterment of humanity. His work is not yet done, for he is now in the full maturity of his intellectual power. His best work is yet to come because he has an insatiable thirst after new achievements. For him the cup of life is still running over with vast undertakings. And because of men like Sarnoff, the world moves, and civilization, with accumulating benefits, is constantly developing. More wonderful than the intellectual attainments of General Sarnoff is the beauty of his mind and spirit. He has been a spiritual leader, a spokesman of Judaism to the Jews, and has been the glorious representative to non-Jews. No man in this country has ever expounded Judaism and Brotherhood to Christians more eloquently or more learnedly. And he seems to count as nothing the extraordinary genius with which God has endowed him. Each succeeding year seems but to add fresh glory to his noble life. One may say of him, as was said about Sir Isaac Newton, "This great man's life brings honor to the whole human race."

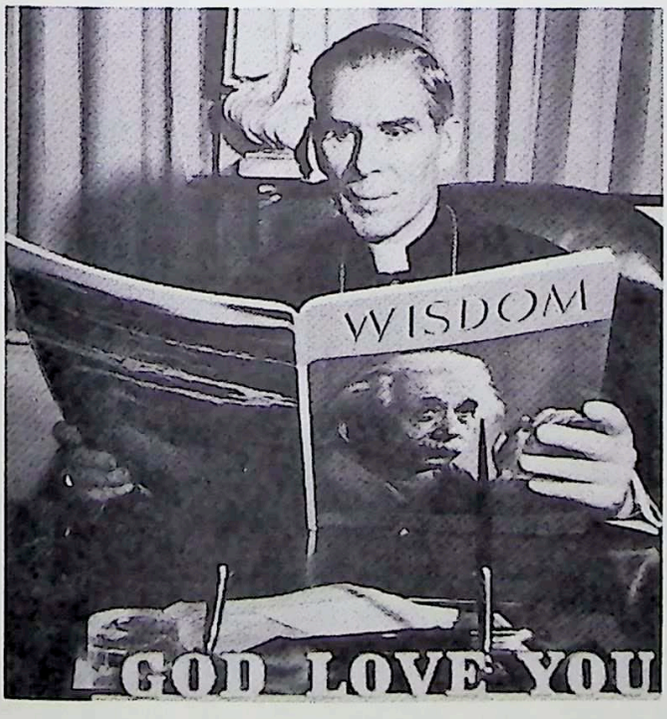


FULTON J. SHEEN
*Clergyman, Educator and Author*



*Sarnoff was cited by New York's Francis Cardinal Spellman, who commended the General's contribution to religious broadcasting on the 10th Anniversary in 1940 of NBC's Catholic Hour. Left to right, Cardinal Spellman, Sarnoff, Bishop Fulton J. Sheen and Governor Alfred E. Smith of New York. Sarnoff's outstanding efforts toward World Brotherhood were also recognized by the Jewish Theological Seminary in 1946, in addition to other religious institutions and organizations since then.*

# THE WISDOM OF SARNOFF ON *Brotherhood*




*The universally-admired Bishop Fulton Sheen, an eminent recipient of the Wisdom Award of Honor, looking at the preview copy of the first edition of Wisdom Magazine. The brilliant and most highly respected spiritual leader, teacher, preacher and educator was one of the notable Americans who inspired and encouraged the creation and publication of Wisdom Magazine. Bishop Sheen's broadcasting activities began on NBC radio in 1930, and his television debut twenty-two years later proved so successful that it made television history. Bishop Sheen has said: "Spiritually, radio and television are beautiful examples of the inspired wisdom of the ages. Radio is like the Old Testament, inasmuch as it is the hearing of wisdom without seeing; television is like the New Testament because in it the wisdom becomes flesh and dwells among us. What was heard is now seen."*

Peace and brotherhood can be achieved. Two of the most potent forces in civilization—religion and science—can be used to create "One World" in its truest and greatest sense. Through religion, we can minimize the evils of envy and greed, intolerance, and a lust for power. Through science, we can reduce the physical burdens of mankind, make the earth more fruitful, create plenty in place of scarcity, break down the barriers of ignorance and misunderstanding, and make life more meaningful for everyone.

We know that peace and brotherhood are the common aims of the vast majority of mankind, yet today we live in two worlds instead of one. This is because a few wicked and ruthless leaders, who dominate hundreds of millions of their victims, have trampled upon religion and all its spiritual values and have misused science for their evil purposes. We may face this threat, however, with the knowledge that religion and science can be far greater forces for good than they are for evil.

The vitality of the human spirit that pulses with renewed vigor against aggression and slavery, against prejudice and persecution, against hypocrisy and censorship, is certain to triumph over the sinister forces of evil.

The pace of science is swift and its strides are tremendous. Yet, man himself has not changed. He is still subject to reason and persuasion. But these require that there be an open door to his mind and to his heart. The best evidence that this is true, can be seen from the fact that dictators fear the minds and thoughts of their own subjects more than they do the guns and fire of their imagined foes. It is the dictatorships and not the democracies of the world that have slammed the doors to the minds of their inhabitants. And they have erected iron-curtains to guard even the doors.

Science makes it possible to pierce the iron curtains and open the doors to the minds of men. Radio, television, motion pictures and other means of mass-communications now are available to serve mankind everywhere. They cannot be stopped by guards at the borders. They can cross mountains and oceans and carry their message of truth, of light and of hope, to the smallest hamlet in the darkest spot on the globe. These modern tools of science can be used to influence men's minds in the right direction and to lift men's hearts toward higher ideals.

There are many products of science that make their mark upon our way of life as we move forward in the application of our increasing knowledge. There were no transoceanic planes in 1918. Today, hundreds of aircraft swiftly wing across the seas. Time is quickly overcome and distance has shrunk. A jet plane can leap the Atlantic in less than four hours, and we are told that New York and London soon will be only two hours from each other. California no longer seems far from New York, for one may have breakfast in the east and lunch in the west.

We have seen how two world wars have ravaged civilization. So, in our constant search for security, we have turned to science for new weapons to serve as bulwarks of our national defense. Radar, atom bombs, guided missiles, homing torpedoes, and robot planes, are but a few of the new defenses we have built to meet the menace of aggression and attack. They are our silent watchmen in the night who serve to guard our freedom and our lives.

It may seem paradoxical to speak of guns and planes and tanks in terms of world brotherhood, but as long as we know in our own hearts that these things are produced to defend freedom rather than to destroy it, there is no paradox. In the light of world conditions, we must be prepared to preserve our society which is based on the freedom and dignity of the individual and respect for the rights of others.

I do not subscribe to the theory that science has given us machines beyond our moral ability to control. The true spirit of science is to create not to destroy. We may use our technological knowledge to turn back the clock of civilization, or we can use the forces of science as master keys to wind it so that its hands will move continually toward a brighter future.

Man must be the master, not the slave of the machine. For the machine has neither mind, nor soul, nor sense of moral values. Only man has been endowed with these Divine attributes and he must be stimulated to appreciate, to develop, and to express these precious gifts of God.

In this spiritual crusade for a free and peaceful world, science is our strongest ally. Science can help greatly to deter the aggressor from attacking the nations he seeks to conquer or destroy. It may even prevent another world war. Or, if the conflict cannot be averted, science can thwart the enemy's designs and help us immeasurably to win it.

In erecting defenses we must not assume that permanent peace can be achieved through military strength alone. The great hope for a peaceful world depends upon an understanding and acceptance of the spiritual precepts, the moral values and the virtues of tolerance and brotherhood. In studying the lives of scientists we find that their love of nature was generally linked with a devout spirit. Everywhere in science, whether in electronics or aero-dynamics, in chemistry or physics, scientists throughout the ages have beheld the handiwork of the Supreme Architect of the universe.

Hans Christian Oersted, the Danish scientist who liberated a mighty force in discovering the relation between electricity and magnetism, exclaimed: "The universe is a manifestation of an infinite reason, and the laws of nature are the thoughts of God." Michael Faraday, the Columbus of the Electrical Age, watched the sunsets as one of his favorite

pastimes, and one day as a rainbow arched the sky he said: "He hath set His testimony in the heavens."

It is interesting to note how man in his constant effort to learn the truth about himself and the universe, turns not only to religion but to science and nature. Lessons of the creative power derived through unity are found throughout nature. Every study of the universe is a lesson in cooperation. The earth and all the planets revolve around the sun, and the moon around the earth, each conforming its motion to that of the other.

Throughout the ages scientists have marveled at the communion of nature's forces all working together. From the energy produced by electrons and atoms there is a lesson that humanity can learn of the power of individuals working together in harmony. Indeed, science preaches a great sermon of brotherhood. Scientists have seen this truth applied to their own activities. They have beheld the importance of a brotherhood among them which transcends racial, religious, and geographical boundaries. Whether pathfinders, pioneers or inventors, they come to realize that in their achievements they have built upon the foundation of ideas and theories established, possibly long years ago, by their brothers in science.

Men must learn to live and work together or all will perish together. This concept of the relationship between men is not new. The ideal of brotherhood has pervaded the teachings of all religious thinkers—Christians, Mohammedans and Jews alike—whose moral and philosophic precepts form the bedrock of our modern institutions and culture. And this concept is basic to a true democratic way of life.

In our own country, we have conducted the greatest and most successful practical experiment based on brotherhood in the history of the world. We have taken people of all races and creeds, of all stations of life, and from all lands. We have blended their efforts, and in many cases their blood, and out of it built a great nation and a brotherhood whose members are called "Americans." Some of us came from foreign lands, but in our hearts and in our thoughts and actions, we are now members of this wonderful exciting American brotherhood.

We have achieved, in this country, the highest standard of living ever enjoyed by any people in the history of the world. We have the greatest measure of freedom ever enjoyed by any people, anywhere, at any time. We have great scientists, utilizing the facilities of the world's finest laboratories. Our industrial machine is unequaled anywhere. We have an alert, healthy population, literate and trained in the methods of modern industry. And our farm families have made this a rich and fruitful land.

It is no accident that America, supremely the land of Liberty, is also

supremely the land of Science. Why? Because science is an attribute of liberty—a symbol of man's freedom to pursue the investigation of the universe without fear of social or political or religious reprisals. From that point of view, science connotes an open mind and fundamental tolerance in the relations between man and man.

America furnishes a dramatic example of what a society based on brotherhood can produce. And we have a responsibility to give other nations a true picture of what we have built here. We can give much more to the world than the production line, or the telephone or television. All these things—all the things we have produced—stem from our way of life, and it is that way of life itself which is the finest product we can offer to the world.

The fate of civilization depends upon people everywhere coming to understand that they are all akin. When they realize this truth, they will not readily forsake the moral and spiritual values of life upon which our civilization has been built. No one can say what is man's destiny on this earth. But we do know that every one of us shares it. We have the opportunity and responsibility to help each other find the way.

New York is to an extraordinary degree cosmopolitan and heterogeneous. Its citizenry is drawn from nearly all nations and races. It reflects the cultures of both the old and the new worlds. It embraces literally millions of the faithful of each of the three major religions of our country. The city is therefore a cross-section of humanity. Its people have had to work out patterns of living together harmoniously. Of course, the process is not devoid of tensions and problems. But on the whole New York offers a living demonstration that men of many races, cultures and religions can coexist in substantial harmony and pursue their separate interests in a spirit of mutual respect for the general welfare.

World brotherhood is the common element in all true religions. It is not only the supreme ideal in itself but the acid test of all other noble aspirations. The most appealing professions of idealism, and the most plausible ideologies, are empty and sterile if they lack this one ingredient.

This nation has reached a new fork in the road of its destiny—a road across which science stands astride awaiting man's commands—commands that can lead to utter destruction, or turn all the world toward a greater civilization.

We live in a time that is testing the spirit of man. It is a time vibrant with challenge, and also with promise and opportunity. Great are the miracles of science at our fingertips. But with all their latent power they are not enough to solve the human problems of our day—or to assure peace for our time and for unborn generations. Science is a

means to achievement, but is not an end in itself. Its triumphs will be empty victories unless they help to make better people, living fuller, more satisfying and nobler lives.

We need more knowledge and better understanding of the forces now facing us. And we also need the faith and spiritual guidance that will lead us to use the amazing new knowledge we have gained from science for the benefit of humanity—and not for its destruction. In troubled times like the present, we must not forget the goals set for us by the noblest spiritual leaders, prophets and philosophers through the ages. Those goals are the same today as they were in 1776. It was true then, and is true today, that the hope of everlasting peace, and a world that is free, has its source in the mind, the heart and the soul of man.

More than ever before, man must find the way to be the master of his own destiny. For his is the master touch that can press a button and unleash fury and pestilence upon the world. By unlocking the tremendous power of the atom, harnessing hydrogen, and controlling electrons, new forces are at man's fingertips for peace or war, for the advancement of civilization or for its annihilation. Only a madman would press the black button marked "Destruction." But the great danger lies in the fact that throughout history madmen, with lust for power and world conquest, have done just that.

The newly discovered forces of nature, properly harnessed and controlled, can make life on this planet richer, more fruitful and more meaningful than ever. But this is possible only if mankind everywhere is determined to work together to use this enormous power for good rather than evil. This task, like all other great ventures, calls for understanding, courage and wisdom. But these are not enough. We must also become acutely aware of our kinship with all fellow men—aware that regardless of color of skin, or cast of features, or religious faith, or political ideals, all men must share a common destiny. And it is vital that they all work together to shape that destiny.

Merely subscribing to the concept of brotherhood, or paying it token tribute through occasional meetings is not enough. To put man's oldest ideal into practice, we must work hard, and very, very fast—I cannot emphasize too much how fast—to bring men together in spirit, just as modern science has brought us close together physically. We must remove the points of irritation that are the roadblocks in our path to true peace.

We must recognize that the things that keep people apart are not the things that they have but the things they lack. They lack understanding, or spiritual values, or the good things of life. If we are to build a true world brotherhood, we must strive to remove those lacks. Not in any spirit of "do-good-ism," but in our own enlightened self-interest, we

must, in degree, become our brothers' keepers.

In doing the job of bringing men closer together, we have two powerful allies—religion and science. Science can give us the things to live with —food, shelter, and clothing. Religion can give us the things to live by —the standards that lend purpose and dignity to man's conduct.

Through religion we can minimize the evils of envy and greed, intolerance and lust for power. Through science, we can reduce the physical burdens of mankind, make the earth more fruitful, create plenty in place of scarcity, and make life more meaningful for everyone.

The great progress we have made in the field of communications can also help to bring about better understanding among men. From the very beginning of time, communication has been one of man's greatest problems in his efforts to survive. Today he has the greatest need and the best facilities for making himself understood to his fellow man. Television can be a strong and powerful force in helping to achieve understanding among nations and people.

The idea of the interdependence of man is not new. The concept of brotherhood is not just a spiritual goal. It is a scientific truth. Everything we have learned about man's origins points up our common heritage and our dependence on each other. No man stands alone or accomplishes alone. Every member of the human race has built on the efforts and accomplishments of his fellow humans. Nowhere is this more evident than in the field of science. The very picture of the universe our scientists paint for us is evidence of interdependence—a lesson in cooperation and unity. The plants of the earth take their form and substance from the energy of the sun; and, in turn, provide the substance of all living animals. The earth itself revolves around the sun, and the moon spins around the earth, each conforming its motion to that of the other.

The very essence of the universe is energy and matter, and the two of them are interdependent and interchangeable. The tiniest form of energy, the electron, and the tiniest form of matter, the atom, can accomplish little by themselves. But multiplied and working in unity with other electrons and atoms, they can release sufficient energy and provide enough power to meet all of man's basic needs on this earth.

Man, himself, has a vast universe of forces which call for unity. He has seen over and over again how puny he is and how little he can do alone—and how mighty he is and what great advances he can achieve when he moves in harmony with others. If the truth of the kinship of man is so self-evident, why is it not more generally recognized by all men everywhere? The answer lies in the fact that each of us is more conscious of the little things that make us different from other men,

than we are of the big things that make us like other men.

The problems and the difficulties of the present provide us with opportunities to build a better world for the future. We have a real opportunity to root out old hatreds and build a true brotherhood of mankind. By our words and our deeds, we must bring to all men a realization of what such a brotherhood can mean. And by our own example in America, we can lend conviction to both our words and deeds.

The men who signed the Declaration of Independence were conscious that the ideal of brotherhood was, in reality, a practical necessity; for they pledged to each other in that document "their lives, their fortunes and their sacred honor." On the foundations of their faith and courage, we have built in this country the greatest practical example of working brotherhood in the history of mankind. We have taken men of all faiths and all races and merged them into a people who are proud to call themselves Americans.

It is not my intention to minimize the problems confronting us. They are gigantic—certainly the greatest in our history. But we have faced perils before and we know from experience the obstacles that men of good heart and mind can overcome when they tackle them together with courage and determination. It is inconceivable to me that the Divine Creator intended man to be eternally at odds with himself—or that he opened the secrets of nature to him simply to enable man to destroy himself. It seems to me far more reasonable to believe that we are endowed not only with the wisdom to preach, but also with the capacity to achieve the Universal Brotherhood of Man and its complement—Universal Peace.

No discovery, or man-made machine, is good or evil in itself. If we are to become the masters of science—not the slaves—we must learn to use the powers of nature and science with good purpose. And that purpose must be to advance the well-doing of our fellow man. The machine has neither mind nor soul nor sense of moral values. Only man has been endowed with these divine attributes. He must be stimulated to appreciate, to develop and to express these precious gifts of God.

In the last ten years, man has acquired immense new knowledge and developed new means that can either advance or destroy civilization. Unless we learn to harness those new powers for useful and beneficent purposes we shall find ourselves the victims of our own progress—trapped by our own genius. That is the great challenge to man if he is to survive—not merely in the physical, but in the spiritual sense.

It is not our scientific skills that have kept us together as Americans, and attracted countless millions to our country down through the

centuries. Rather, it was our early recognition of the transcendent importance of the things of the spirit—of common understanding and sympathy and mutual aid. Nor is it science alone that creates the brotherhood of man on earth. Science gives us a common meeting ground—a sharp tool, it is true, but the mortar of brotherhood must come from the heart, not the laboratory.

We have entered the Electronic Age as apprentices. We are far from being journeyman workers in this complex domain. With every new advance we become more acutely conscious of how much remains to be done, how little we know, and what a vast and unknown area lies before us for exploration and analysis.

Both the electron and the atom hold incalculable treasures for peace and civilization which the world will squander unless we are successful in making them instruments for good rather than evil. Tremendous is the opportunity for those who would build for peace, progress and prosperity, for they have these two wondrous building blocks of the universe —the electron and the atom. Man has learned these vital secrets of nature in our own lifetime. And the responsibility is ours to do all we can to guide these new forces toward beneficent uses for all mankind.

Man could not release the energy from the atom, control it by the electron, send messages and travel through space were it not for a Supreme Architect who has designed the universe to function in an orderly fashion. The sun, the moon and the stars are not accidents. Their harmonious interrelationship, and their effects upon life on this earth, may be beyond our own full comprehension, but they are clear manifestations of a Supreme Intelligence.

To blend material and spiritual powers harmoniously, man must be guided by the teachings of religion as well as the lessons of science. And in the spiritual crusade for a free and peaceful world, science and religion can be powerful allies. Ever since the dawn of civilization, religion and science have been the golden keys in man's age-old efforts to unlock the secrets and the truth about the universe so that they might be converted into human values. As we learn the lessons they teach, we become more aware of the mysteries of nature and of life itself.

Life itself is an impenetrable secret. The enormous machinery of the universe and the immensity of space are astounding. Life would be frightening were it not for faith. We must have the faith to believe that the Creator of the universe did not bestow upon mortal man his intelligence, his ability to research, to discover, to invent and engineer, in order to destroy the very things he was empowered to produce.

I believe we are witnessing a revival of faith in the destiny of mankind.

So let us not be discouraged when, at times, the signs of friendship and brotherhood between some nations are invisible. Rather, let us find courage and hope in the fact that nations consist of people, and deep in the hearts of all people there exists a feeling of kinship and a cherished desire to dwell together on this earth in peace. Man, by recognizing the kinship of all people as brethren, and by following the simple precepts of brotherhood, can climb to new heights of glory and to a finer destiny.

The superiority of the free world in science and technology, no longer can be taken for granted. On that level, the world is swiftly approaching what I call "Dreadful Parity"—the condition when each side has equal capacity to inflict nearly total destruction on the other. But on other levels, in terms of basic morality, elementary justice, religious insights, the free world still holds a clear primacy. These concepts—reflecting man's eternal hungers for peace and brotherhood—will weigh heavily in the scales of destiny. They can be, and I hope will be, our decisive advantage. We must fortify our positions on those higher levels, and steadfastly refuse to debase the moral currency of our civilized heritage.

We are engaged in a race between barbarism and brotherhood. Fortunately, we know that the peoples in the Communist sphere—as distinct from their rulers—share our yearnings for human dignity and peace. The ferments under the policed surface of life in the Iron Curtain countries are becoming more evident with each passing day. While they may increase the immediate hazards of "adventurism," they may, on the other hand, have the opposite effect and serve as a restraining influence.

The political hierarchs of the Communist party do not trust their own people. They do not trust even their topmost military leaders—as recent events have amply demonstrated. There are millions of men and women on the dark side of the Iron Curtain who hate their Soviet chains. They are the secret legions of freedom—normal men and women open to the dynamic appeal and example of brotherhood. Abraham Lincoln said: "Mankind finds its freedom in the brotherhood of life," and that our country has been held together, "by that sentiment in the Declaration of Independence which gave liberty to all the people and hope to all the world."

There may be differences of opinion on the best ways to achieve world peace. But all of us, I am sure, agree with the statement made by General Dwight D. Eisenhower that—"what the world needs today, even more than a giant leap into outer space, is a giant step towards peace." This is the real challenge to humanity.

Mankind is adjusting itself to a changed and still changing environment. But it is well to recall that despite the torrential downpour of inventions

and discoveries, the twentieth century has also won victories, great and small, on the cultural and moral levels. They are spelled out in more widespread education, in easier access to the products of genius in all the arts, in society's vastly larger concern for the old, the widowed, the helpless. The same decades that saw the birth of television and the splitting of the atom also saw a great improvement in race relations and the enactment of vital social legislation.

In this fast changing world the pattern of living has become highly intricate, with each man's destiny meshed more closely than in the past, into the destiny of his fellow men. Our own survival depends literally upon the survival of our neighbors. An active interest in community problems, participation in civic life, once moral luxuries for the few, are today clear necessities for all. The reciprocal obligation as between the individual and society is inescapable.

Neither personal success nor wealth can any longer provide a guarantee of safety for the individual. They mean little unless the larger problems affecting the community and the nation are solved. To meet the demands of these times, each of us must be prepared to make contributions to society even at what may seem a personal sacrifice.

We live in a world foreshortened by modern communications, closely interdependent and as sensitive as a seismograph to disturbances in any of its parts. Not only events but even states of mind in other countries on other continents have a direct effect, for good or ill, upon our own vitality and welfare.

The unique and fateful fact about the present time is the tempo of discovery and invention, the dizzy speed with which a multitude of fascinating changes have come upon us. This terrific acceleration of science has left us a little bewildered and a lot frightened. Today, the confusion of spirit with which we confront atomic energy is the most striking example of the distressing truth that change is coming faster than we seem able to absorb and digest it. The crux of man's problem today is his inability as a social and economic creature to keep step with the swift march of science and invention. Physical distance has been all but canceled out, yet the distances between the hearts and minds of men and of nations are as wide as ever. Man is mature technologically while still an adolescent spiritually.

The pattern of living has become so intricate that each man's destiny is meshed, more closely than in the past, with the destiny of his fellow men. Our own survival has come more and more to depend upon the survival of our neighbors. Active interests in community, national and world affairs, once moral luxuries for the few, are now clear necessities for all. The reciprocal obligation between the individual and society can no longer be escaped.

An old Talmudic legend that concerns the creation of Adam has a direct bearing upon man's relationship to man. The story, which dates back to about the third century of the Common Era, tells us that God took dust from the four corners of the earth in order to shape the first man. Pondering the meaning of this legend and seeking a way to teach their people, the rabbis of the Talmud reasoned that God deliberately mingled the dust of the world in order that all men may claim the same Father. Many centuries later in England, during the time of Queen Elizabeth, the same thought about the kinship of all men was expressed by John Donne, the famous poet-priest, in the sermon from which Ernest Hemingway took the title for his book *For Whom the Bell Tolls*. Donne said: "No man is an iland, intire of its selfe. Every man is a peece of the continent, a part of the maine; if a clod bee washed away by the sea, Europe is the less, as well as if a promontorie were; as well as if a Mannor of thy friends or of thine owne were; any man's death diminishes me, because I am involved in mankinde; and therefore never send to know for whom the bell tolls. It tolls for thee."

The ideal of brotherhood is not just a pretty theory. Modern science is daily uncovering new secrets of nature that reinforce the truth of the ancient religious ideal. Biology, chemistry, indeed all the natural sciences, point up the essential oneness of mankind. Anthropology, sociology and the host of related areas stress the interdependence of men. We know that physically all men are members of the same species. We know they have the same emotions and appetites. We know that the basic ambitions of all men, wherever they may be, are much like yours and mine. We know that in our hearts, most of us want, above all else, to earn the respect and affection of our friends, and to live in peace and comfort with our families and neighbors. It is interesting to note how science and religion have here reached the same conclusion. This is not strange, for the truth is always the same regardless of what avenue you take to reach it. And science and religion are partners in man's constant effort to learn the truth about himself and the universe.

Thomas Edison once said: "I begin where the other fellow left off." But others began, too, where Edison left off. Scientists and inventors have contributed much that is new and important to the development of radio communications, broadcasting, radar, television and industrial electronics. But all of these services are based on the fundamental discoveries and inventions of the pioneers—Scotch, German, Italian, English and American. Their investigations revealed the truth of natural and physical laws. I could go on and on and recount endless evidences of brotherhood as practiced by scientists—each profiting by the experiences of others. All working for the common good. I cite the cooperation in the scientific field, because it proves to me that men of different faiths and nationalities can recognize their common interests; that they can work together; and that they can take what the other man has produced and improve upon it, rather than try to destroy it.

Cooperative effort is not limited to the field of science. You find it in

all forms of human endeavor. I know from my personal experience that achievement in the business world is the result of the combined efforts of many people and, indeed, of many industries. A television receiver, for instance, contains more than a thousand separate parts that are produced by many thousands of different men and women, working in hundreds of different factories in all parts of the country. They are finally assembled to make up the instrument which brings music and entertainment and education into your home.

If the principles of brotherhood are true, and if we have many examples of their practical application, why haven't we been able to use them to achieve peace among nations? The answer, it seems to me, is ignorance and envy—ignorance of what the other man is like and of the motives behind his acts; envy of the things that one has by those who have not.

Our task is to remove the blindfolds that keep men from seeing the simple truth; that, despite differences in the color of their skin, or the cast of their features, or their language or religion they are truly of the same dust. I believe with all my heart that we can do this. The products of science in the hands of men of good will can do the job. And our spiritual leaders of all faiths are pointing the way. With their guidance, the great progress we have made in the field of communications gives promise of bringing about better understanding among men. Electricity sets the emptiness of space in motion so that, by radio and television, nations are linked and people all around the world can listen and learn about each other. Broadcast waves do not discriminate against any race, religion or creed. They recognize no national origins or boundaries. They travel into the homes of Protestants, Catholics and Jews alike.

I am indeed happy that I have been privileged to play a part in helping to bring to fruition the plans of the Catholic, Protestant and Jewish faiths to broadcast regularly their religious and spiritual programs to vast audiences. That is only one example of the ways in which radio and television can break down the barriers of ignorance that keep men apart.

Science can do much more than break down the barriers of ignorance and make men understand each other better. It can also make the earth more fruitful and life easier for everyone, thereby removing one of the main causes of dissension among nations. Man has been on the earth a long time and life has always been difficult for him. He has had to work and struggle to wrest a meager living from nature. It is not hard to understand how suspicion and envy can arise under such conditions. But today, science has provided the tools that give promise of making life easier for all.

In the short span of my own life I have witnessed the miraculous developments of the electronic age. Each of us has felt the impact of electronics through thousands of products that contribute to better living.

We stand today on the threshold of a new era, bright with promise. If man turns his thoughts toward the possibilities of science for peace instead of war, all the new inventions can be used to make the earth so fruitful and life so pleasant for all men, that there will be little cause for envy. In this new climate we have a real opportunity to root out old hatreds and build a real brotherhood of mankind.

Today we are mobilizing all our resources to defend ourselves and our freedoms. It is important to the world that we should do this for we can best serve the cause of world peace and world brotherhood by remaining strong and productive; a source of aid to the world; and a symbol of freedom and democracy and good will to all men.

Peace can be achieved only through strength. The world has little respect for weakness. For weakness too frequently is associated with fear, and fear is not an attribute to either peace or brotherhood. But guns, and tanks, and planes and production lines alone will not do the job. We must strive to perfect brotherhood at home if we are to help establish it abroad. To do this, we must recognize our own shortcomings. We must pioneer in the realm of social science just as we have in the physical sciences. We must be willing to risk some of our comforts in an effort to find a better way for men to live together, just as explorers have been willing to risk their lives to find better lands for men to live in. We cannot afford to have static minds and see nothing wrong with yesterday, no opportunity to improve today, and have no interest in what happens tomorrow. The brotherhood of man, either at home or abroad, will not be preserved by inaction or disinterest.

I think the world is ready for a spiritual mobilization. Many men of religion have told me—and I have observed for myself—a notable increase in recent years in the numbers of people seeking spiritual guidance.

At the moment, I must confess, we see few signs of brotherhood in the dealings between some nations. And yet I am not discouraged by that, for nations consist of people, and I sincerely believe that deep in the hearts of the people of the world there is a feeling of kinship and a desire to live together in peace. Every day we see millions of people voluntarily responding to the call for aid, at home and abroad. This is the normal outpouring of the heart of humanity, fumbling and reaching for a true brotherhood of mankind.

No one can say what is man's destiny. But we do know that every one of us shares it. We have the opportunity and responsibility to help each other find the way.

As I look at the history of mankind, it seems, in a sense, like a group

of people creeping slowly, painfully, up the side of a great mountain. Today, we are higher than we ever were before. A clear path to the summit is almost within reach. But there is still dangerous climbing ahead. We must watch our step if we are not to fall.

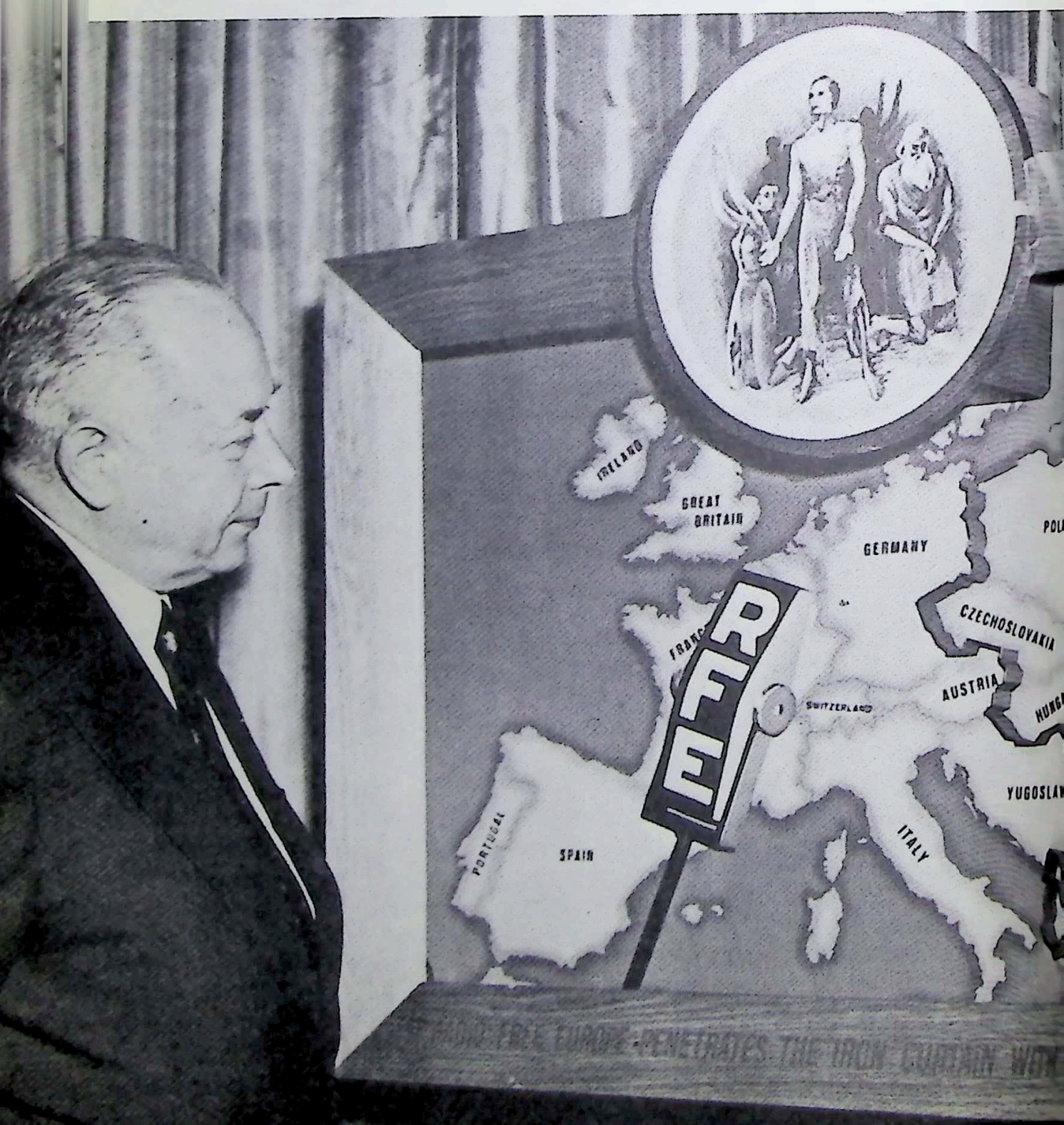
Man, through science, has proved his ability to produce more of the good things of life than ever before. Man, through ignorance and mistrust, runs the risk of losing all he has gained since the dawn of civilization . . . and losing these gains just at the time when still greater gains are in sight. But man by recognizing his kinship with his fellow men, and following the ways of brotherhood, can go on to immeasurable heights.

Today, we face a great threat and a thrilling opportunity. The possibilities of science enable us to look bravely at the stars and to seek a finer destiny. We need most the faith and spiritual guidance that will lead us to use our new knowledge for the benefit of humanity and not for its destruction. The hope of peace that is lasting, and a world that is free, lies within the soul, the heart, and the mind of man. Not yet have we reached our goal. The struggle to attain it is long and hard. But it is the golden spur of a divine dissatisfaction we feel, that lifts our aspirations and makes for human betterment—as we strive onward and upward.

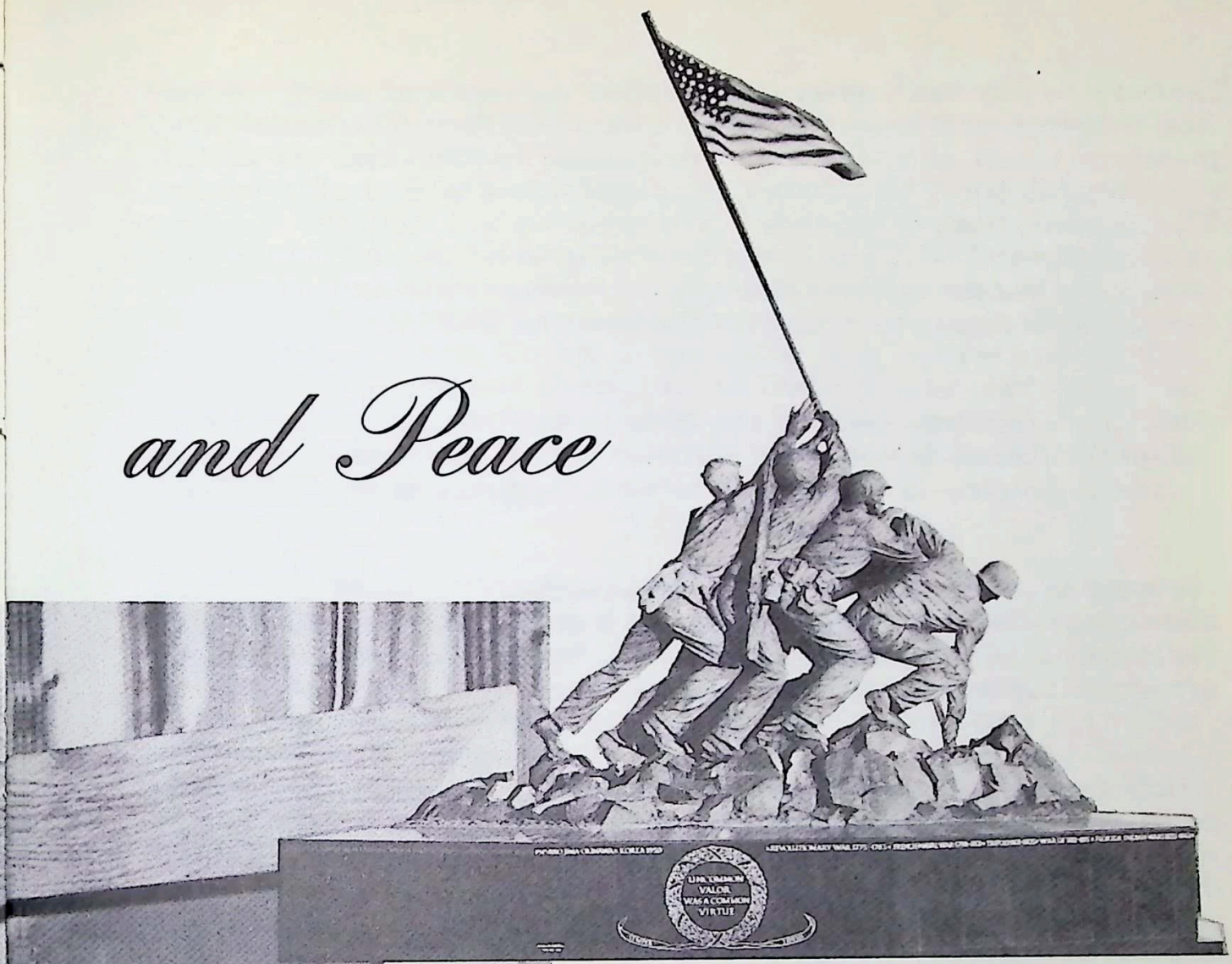
"So teach us to number our days, that we may apply our hearts unto wisdom."
—OLD TESTAMENT

"If any of you lack wisdom, let him ask of God . . . and it shall be given him. But let him ask in faith."
—NEW TESTAMENT

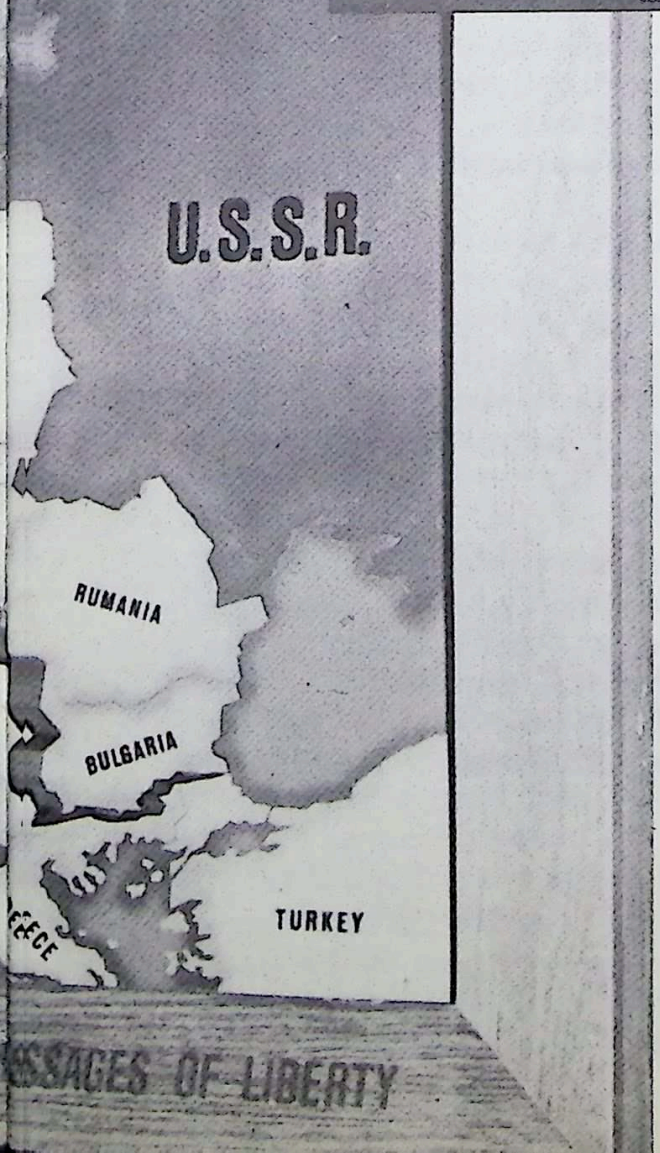
# THE WISDOM OF SARNOFF ON *War*

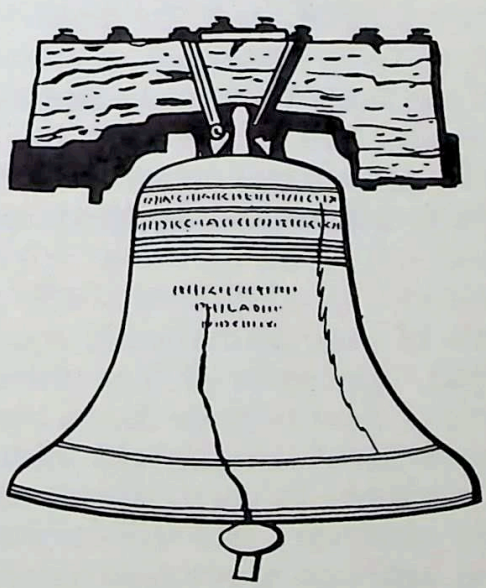


# and Peace




*The famous Marine Corps Memorial Statue in Washington, D.C. Engraved on the marble base are the words, "Uncommon valor was a common virtue."*



*General Sarnoff inspects an ingenious display created for the Crusade of Freedom in support of Radio Free Europe. When the microphone lights up, the chains worn by the enslaved people (top circle) appear to melt away.*

Destiny has imposed a great mission upon the men and women of the Armed Forces, as it has upon all Americans and their government: the preservation and strengthening of democratic freedom and the defeat of tyrannical world communism, by peaceful means if at all possible. The awesome truth of our time is that either we will fulfill this mission energetically and fearlessly, or we will fall ignobly into an era in which ideological dogma replaces free inquiry, political demands supplant human aspirations, and mass man smothers the individual.

There are many steps that could be taken by individual Americans, both within the Armed Services and without, to help their country in this decade of danger—in the struggle between Communism and Freedom.

We must be willing to sacrifice. The safeguarding of our cherished freedoms cannot be bought cheaply, nor can it be bought once and for all. Each generation of Americans must be ready to purchase it anew, paying when necessary in the coin of life and treasure.

To win the war—and win it we must—will call for substantial sacrifices in material terms. But the notion that it will require a deep cut in living standards—either for military or civilian personnel—underestimates the wealth and productive genius of our country. The more demanding sacrifices will be in the psychological and moral domains. Our people, in short, will have to renounce complacency, euphoria and illusion. They will have to embrace the grim but inspiring realities of our epoch. May it never be said of us, as Marshal Petain said of his countrymen after the fall of France in 1940: "Our spirit of enjoyment was greater than our spirit of sacrifice. We wanted to have, more than we wanted to give. We pared effort and we met disaster."

We must cultivate a deeper appreciation of moral and spiritual values. No one denies that we need the best military hardware that science can produce to guarantee our survival. But this will prove tragically inadequate if it is not backed by the hardware of the spirit.

Regardless of how dramatically the known and accessible universe may be enlarged, the center of that universe remains man himself. Recognition of this ageless premise is the best guarantee of inner stability as the pressures of a changing world multiply. Without it, the human being will lose the sense of personal responsibility for his own conduct and for the course of history. He will become rootless, indifferent to the divine spark that sets him apart from lesser creatures.

Nothing that science or technology can conceivably produce in the future will cancel out the moral imperatives and spiritual insights of the past and present. Freedom and justice, love and conscience—these are aspects of mortal existence more abiding than bronze. They provide elements

of certainty in a period of crowding obsolescence. They give us a secure anchorage amid the vast tides of change—a sense of direction amid the complexities of our time.

The preservation of any free society depends, in largest measure, on the conscience and sense of duty of its citizens. This sense of duty was dramatically exemplified, some three hundred years ago, in the Declaration of Independence. Today, if our nation is to survive and flourish, there must be a personal Declaration of Dedication by every American to those ideas and ideals upon which our nation is founded. As human beings, each of us can do no more. As men and women who love our country, we can do no less.

Man has been on earth a long time. He has had to toil by the sweat of his brow and he is tired by that toil. He has had to go into the mines and into the forests for fuel. He has had to go into the fields to cultivate the soil and to depend upon the elements for his harvest. Much of his work is unproductive, for even in converting energy into electric light, most of the energy is lost in useless heat. Man cannot survive without food, shelter and clothing. Yet, all people on this earth do not share equally in these basic needs of life. And this inequality breeds discontent, hostility and war.

It is man's excuse that he has too little opportunity for spiritual development because so much of his time is devoted to work and to sleep, to combating disease and to fighting wars. But has he not learned a lesson from the horror of war? And has he not been given a new opportunity which may lighten his burdens? Is it not conceivable that in unlocking the secrets of the atom, science offers man a natural power to meet his basic needs with less drudgery and without conflict? May not the new mechanical slaves at his disposal give man the means and the time to obtain and to enjoy more of the spiritual and cultural values of life? Through atomic fission, it may become possible to facilitate the creation of raw materials so that all people will enjoy an abundance of natural wealth, and thus remove one of the age-old irritations that leads to war. Should all of these possibilities become realities, they, plus the great potentialities of the electron, will contribute greatly to the advancement of civilization.

Today man faces a thrilling opportunity as well as a great threat. The potentialities of science enable him to look bravely at the stars and to seek a finer destiny. He needs most the faith and the spiritual guidance that would lead him to apply his new knowledge to peaceful pursuits. For the hope of peace that is lasting and a world that is free, lies within the soul, the heart and the mind of man.

If man will exercise his imagination and work hard in the arts of cooperation, good will and peace, as he does in the field of physical science, he

will find that the road ahead is one of progress. And this highway should lead to peace and prosperity.

The challenge we now face is on three main fronts—the military, the political and the economic. They are interrelated and interdependent. In our necessary concentration on technology, we must not ignore the menace of Communist ideology which is part and parcel of the same implacable challenge. We have seen how cleverly the Communist leaders exploit their technological advances to create a psychological impact upon people everywhere.

In the battle for men's minds, Soviet successes have been due less to the genius of the Kremlin than to the lethargy of the West. After all, we are not without opportunities for taking the initiative. The Soviet empire is racked by inner pressures, problems and dangers. The enemy expertly exploits our internal tensions, yet his own tensions are vastly greater.

Our basic policy should be directed toward a program that assures our supremacy on the military, political and economic fronts. It is not enough for us to limit ourselves to an effort to "catch up" with Russia. To Russia should be assigned the task of catching up with us. Our strength—in weapons, in diplomacy, in economics and in spirit—must be such as to discourage the present Soviet strategy of intimidation and nibbling and to deter wider aggression. This position of strength would help to advance the cause of peace.

Historically, one of America's greatest sources of strength has been its ability to accommodate—and even to encourage—technological change without changing its own basic emphasis on individual freedom and human dignity. Today this ability to adjust to economic change is more important than ever because of the Soviet strategy of "peaceful competition." "The threat to the United States," Khrushchev once said, "is not the ICBM but in the field of peaceful production." He boasted that Russia would overtake the United States economy as early as 1970.

The gallant men and women of our fighting forces, in their battle for freedom and justice, have an alliance with science as no other crusaders ever had in history. At this very moment in all parts of the world, they are using the latest developments of electronics to regain peace for the earth. Throughout the ages, history has written in letters of blood, that the ultimate principle of man's moral code must be an enlightened altruism. If he is to remain a civilized creature his goal must be the common good.

The great problems which lie before us must be solved and the results coordinated, if we are to have peace and security. Education is one vital factor in that solution. Communication is another. With a free press,

and a free radio and television the methods of communication which science is constantly enlarging will enable us to enlighten a waiting world.

I believe that through the amazing progress in electronics the peoples of the world will know each other better. Today, American radio and television, because of the constant messages of courage and good will, truth and sincerity, which they have broadcast in the name of Liberty to oppressed populations, is acclaimed overseas as "the Voice of Freedom." It can also be "the Voice of Peace."

Radio and television belong to the people of all nations. By their very nature they are the essence of freedom. They bestride the continents and leap across frontiers to reach all men, rich and poor alike. The size of the earth has been shriveled and distances annihilated, making this planet a mere community and all people neighbors. Europe's relation to America is no longer the "detached and distant situation" that George Washington noted in his Farewell Address. There is no national exclusiveness in radio and television—no trace of narrow isolation in waves that carry friendly voices to every nation and into many millions of homes at the speed of light.

Science can give to the essential freedoms the wings needed to reach people everywhere—simultaneously! Therein lie radio's and television's great roles in the establishment and perpetuation of peace. Today, radio and television and the press are inseparable in the defense of freedom of speech and expression. Liberty is the watchword. To this end America must have more powerful facilities and more effective international programs to serve a world at peace. We must have sufficient world-wide radio and television circuits to carry news and pictures freely and directly to and from all corners of the earth.

The impact of enlightened public opinion upon individual thought can be a vast influence for good. It can stimulate ideas. It can strengthen belief. It can bring hope. It can inspire courage. False propaganda can degrade public opinion, brutalize millions of people, and touch off a wave of fanaticism that leaves half the world a barren desert. We need more than merely the better means of world communications which science has given us. We need more than the easy ability to communicate with each other in the world we all envisage. We need most to keep the channels of that communication free so that man's noblest thoughts, untrammeled by censorship, may best serve mankind.

International television is a new educational force with a double appeal to eye and ear, put at man's disposal by science, to give him a new and more intimate understanding of his neighbors. Pictures are an international language. They convey clearer and quicker impressions than words spoken in a foreign tongue, or written in a foreign language. Nations can see themselves as others see them, for the world is destined

to go sightseeing by radio and television. People everywhere will understand, as never before, how freedom functions in democracies.

Not only a greater hope for lasting peace, but a greater opportunity for economic freedom—freedom from want—is embodied in science. On every hand we see evidences of man's ingenuity to create new products to fulfill his basic needs by mastery of nature through science. At the moment he is looking upward to the air which already offers him new and speedier means of communication and transportation.

The men who have been applying science in the laboratories for war on the battlefronts, are directing their talents and skills to science for peace. These scientists are going onward in their conquest of space. Through their genius, science will provide in ever increasing abundance, the necessities, the comforts, the luxuries of life and will enable civilization to triumph over hardship, famine and disease. But that greatest of earthly blessings—Universal Peace—is not to be discovered as an invention in the laboratory. It is to be found only in the hearts and minds of men.

We are confronted by a new kind of enemy whose menace can no longer be measured solely by military yardsticks. He aims not only at physical conquest and world domination, but also at the conquest of men's minds and spirit. His might cannot be calculated merely in the arithmetic of armed forces and materiel, because he employs techniques designed to weaken our will to resist, our will to remain strong and free. This is the design of the communists.

World communism, with its high command in the Moscow Kremlin, is a past master of infiltration and subversion, fifth columns and false-fronts, sabotage and terror, civil strife and treacherous diplomacy. This adds up to a challenge of a new order, and one to which we are not yet psychologically adjusted.

The communists are breathing down our necks in the matter of air and naval power. And there is no discernible limit to their resources in man power. We dare not let this trend continue, or we shall be left behind in the race. We have no alternative but to maintain and increase our lead in nuclear weapons, guided missiles, air and naval power, early warning systems, electronic superiority and all other pertinent forces. We must maintain adequate and well-balanced ground, sea and air power and vitality.

Because of the nature of war in the nuclear and electronic age, military strength alone is not sufficient assurance of survival. The immunity this continent enjoyed in the past has been canceled out by scientific developments. In any future large-scale war, there may be no noncombatants.

The fighting front will be everywhere.

World communism has been making war on our civilization for nearly four decades, ever since the Bolsheviks, entrenched in Russia and disposing of its resources, launched the Third or Communist International. Periods of seeming communist moderation have repeatedly been used as a cover for fanatic build-ups and deployments for the next big push. Let me say it bluntly. The talk about the war being over is dangerous wishful thinking. Unless we fight war, and fight it with a concentration of effort for victory, we shall lose by default.

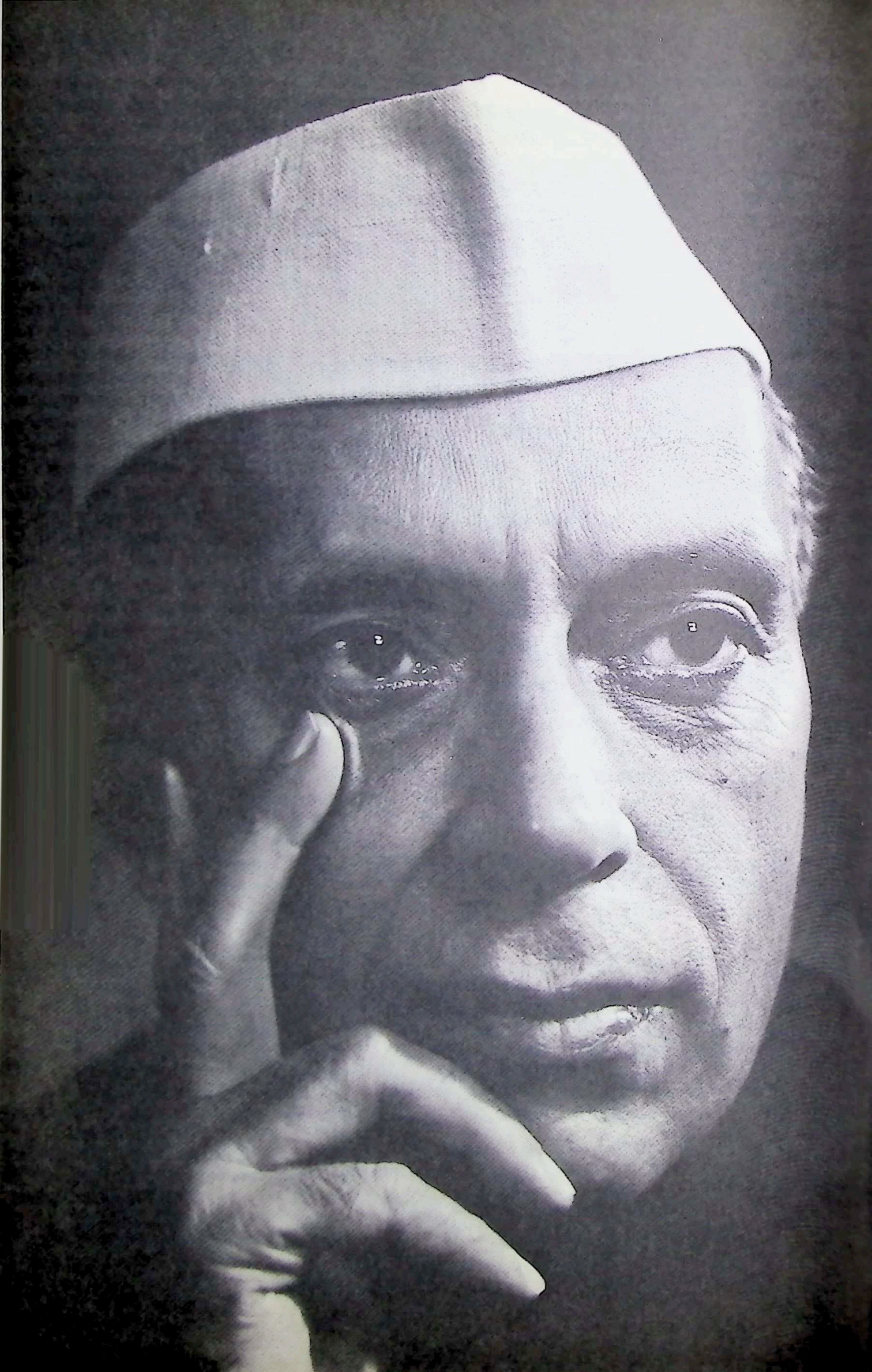
How shall we mobilize all our resources, material and spiritual, to meet the crowding dangers of this historic period? Building national security is like building a house to shelter us from the elements. We need a plan, building materials, and able, devoted workmen. It seems clear to me that the structure should consist of three major wings, all closely and harmoniously integrated. First, we must maintain our military strength at the point where the fear of reprisal will deter any nation from attacking us. Second, we must develop a civil defense program to insure the maximum support of our armed forces if hostilities do come. Third, we must pursue victory.

The present war is not simply a preliminary bout but the main event. Halfway measures cannot stave off defeat. We must bring to it all-out effort, backed by all the brains and resources we can mobilize, or we shall live—and die—in a fools' paradise.

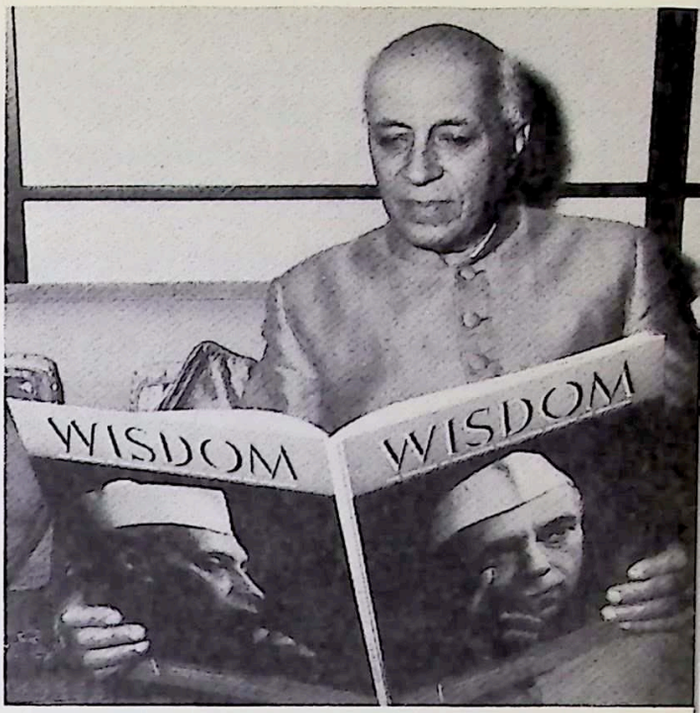
The great temptation today, as in all times of crisis, is to compromise on ideals in the name of expediency. We are counseled, by some who fly the banners of so-called "realism," to recognize the "finality" of a world half-free half-slave and make the best of it. That sort of logic has backfired ever since the first such realist asked, "Am I my brother's keeper?"

In a world made small by modern communications and modern weapons, we are our brothers' keepers. We cannot, in the long run, remain uncontaminated and safe when half the world is festering with the sores of terror and torture, godlessness and despair. Even recent history offers proof that what passes for hard-headed realism in its day may appear tragically unrealistic in the perspective of events.

Why are the oligarchs in Moscow and their stooges in captive capitals so loud and lavish these days in promising to "liberalize" their regimes? Why have Stalin's successors been driven to make a scapegoat of the dead despot, to convince their subjects that the crimes connected with his name are things of the past? The answer is fear—fear of that ferment and what it may portend. Revolutionists themselves, they live always



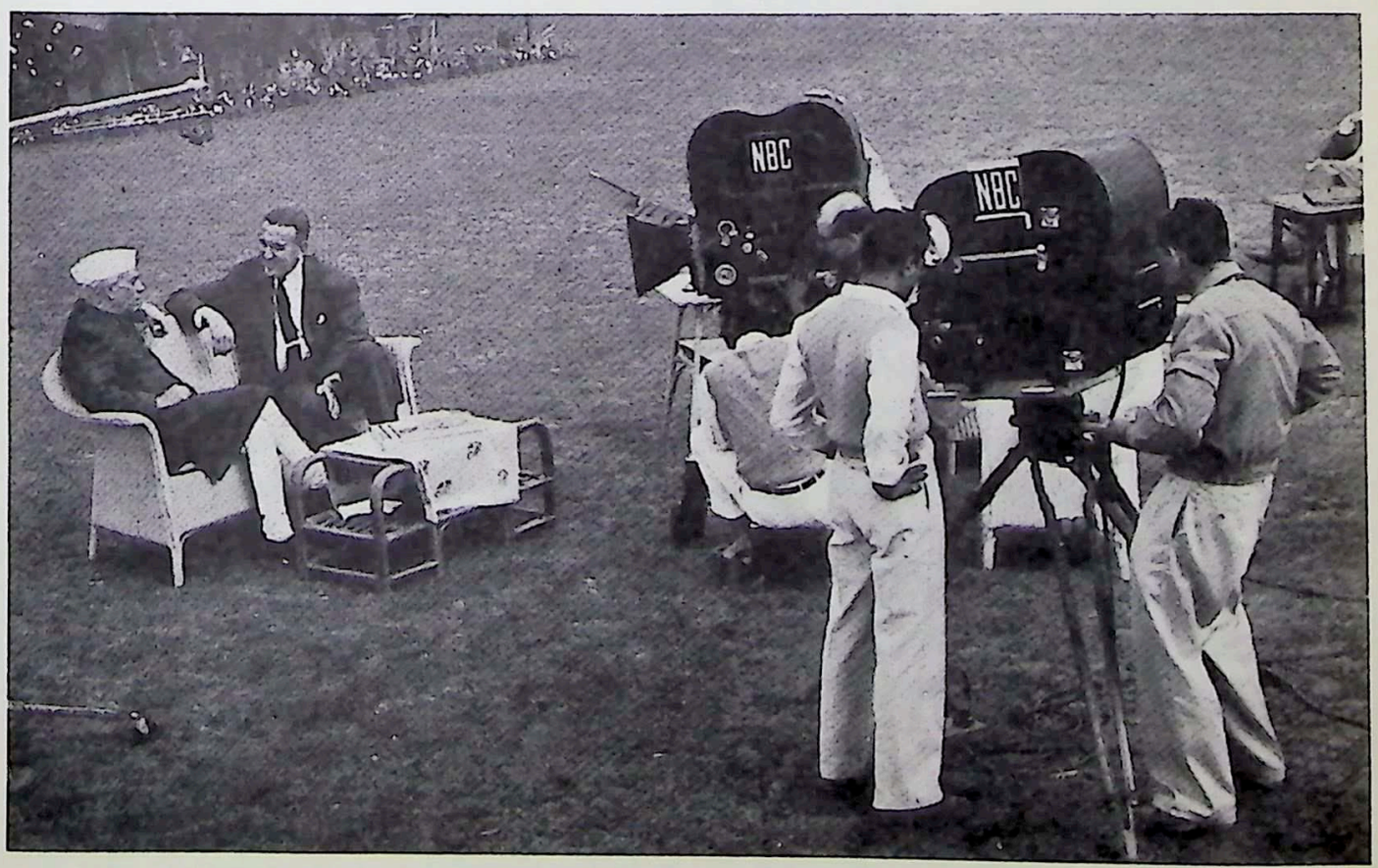
*Jawaharlal Nehru, reading the special edition of Wisdom Magazine on which he collaborated with the Editors of Wisdom. It was devoted to his wisdom and published in tribute to his distinguished achievements as Prime Minister of India and his enormous accomplishments in shaping the destiny of five hundred million people. When this eminent recipient of the Wisdom Award of Honor appeared on the NBC-Television Wisdom Series, he described his early life, his friendship with Gandhi and his experiences and hardships during his country's struggle for freedom. He also expressed his views on the problems India now faces and the present critical world situation.*




None of us can say what and when we can achieve. We cannot command success. But success often comes to those who dare and act. It seldom goes to the timid who are ever afraid of the consequences. Great men play for high stakes, and if they achieve great things it can only be through great dangers. To the small company of the truly great David Sarnoff belongs, because of his bravery, his vision, his practicality, his lofty idealism, and his passion to serve humanity.

Jawaharlal Nehru

JAWAHARLAL NEHRU
*Former Prime Minister of India*




*India's Prime Minister Nehru discussed world events with Chester Bowles, U.S. Ambassador to India, on the NBC-TV "Wisdom Series."*

in dread of revolution. Communist brutality may succeed in holding those millions in bondage for many years to come. Yet, all history shows that revolutions, which seem "impossible" before they happen, are recognized as "inevitable" after they happen.

The least we can do—not only for their sake but for our own—is not to sell the captive peoples short; not to deny them the moral support of our understanding, our sympathy and, above all, our faith in their ultimate liberation. In the long run their freedom is closely related to our own.

If the communist fifth column in our country can be counted by the thousand, the forces of freedom in the Soviet lands can be counted by the million. These are our actual or potential allies. Let us keep faith with them. But we fail in this respect to the extent that we allow ourselves to be lulled and gulled by Moscow's slew of slogans and promises. The extraordinary fact is that so many throughout the world were duped by approximately the same slogans and promises repeatedly in the past. Apparently the Kremlin is counting on our short memories and on our anxiety to believe.

Today we are drifting into another period of self-deception. The Russians have thrown out a new Party-line, baited with the same old worms. And the fish, alas, are biting. Luckily this new surge of false optimism is not so strong in the United States as it is in most other free countries. The evidence that Moscow's old trick is working its old magic is too clear to be ignored. We see it in the fact that blood-stained Kremlin dictators are being received as honored guests in democratic countries. These men and their associates stand self-indicted as criminals and despots. They cannot wash the blood from their own hands by pouring all the guilt on the dead Stalin. It is both strange and sad that any free government would choose this very time to invite such gentry into their democratic households!

Apparently the intellectual ferment in their country has the Kremlin bosses worried. They are trapped by a historical dilemma. To run their expanded industrial setup they must produce more and more educated personnel, but every newly educated citizen adds to the potential of discontent and rebellion. Their growing output of scientists, engineers and technicians whose minds are sharpened by the disciplines of science must, in the long pull, constitute a serious threat to a regime based on falsification. The regime is thus forced to produce what may prove to be the instruments of its own destruction.

Will the free world continue to drug its senses with wishful thinking, and thus give the enemy time to prepare his next series of big blows? Or will it find the wisdom and the valor to face up to the relentless war being waged by the Soviets and exploit the present opportunities? The

answers to such questions do not rest with the government alone. They rest with every one of us. Liberty, for our beloved America, is still the rallying cry. That's our "party-line." It must and can prevail.

Freedom can survive only in an atmosphere of truth. Such an atmosphere just does not exist behind the Iron Curtain. A government which springs from a philosophy of falsehood and is built upon a structure of lies, can maintain itself only as a police state that must hold its people in virtual bondage, enslaved in mind and in body. The dictator who rules under such conditions can not afford to let the truth break through to the people. If they knew the truth, they would demand to be free.

Today, more than ever, we must have the courage of our dedication to liberty. It seems to me crystal clear that we cannot be indifferent to, or ignore the threat to, the still-free nations badgered by communist pressures, without deadly peril to everything we cherish.

We must work as a team but we must not lose our sense of the uniqueness of man's genius—of the supreme value of the individual. In this lies our best safeguard against the deadly regimentation of communism. It is our best hope for a future of peace, abundance and freedom.

If we are to deserve our birthright of freedom, we must be prepared tc cultivate and defend it. We dare not shut our minds to the truth that our civilization is being menaced by a strong and fanatic enemy. We must be determined and tireless, working day and night to encompass the annihilation of the things we most cherish.

We cannot banish dangers, but we can banish fears. We must not demean life by standing in awe of death. I do not doubt that we shall win in the deepening struggle between liberty and enslavement; that we can emerge better and stronger from the contest. Indeed, we could lose only by default—and we must see to it that we do not default. American hatred of war is too obvious to need proving. But weakness or fear will surely not avert it.

We live in a world so shrunken that political and social explosions anywhere produce instant and frequently serious tremors everywhere. Like it or not, we have become in large measure our brother's keeper. Areas on the world map, which not long ago seemed too remote and exotic to interest anyone but archeologists and anthropologists, have now become items of front-page news and seed-beds of international trouble.

One of the main objectives of Soviet intrigue and diplomacy has been to isolate the United States by stripping it of friends and allies. Every

symptom of free-world disunity—of what the communists call "contradictions in the camp of imperialism"—brings joy to the Kremlin. Moscow has used everything from cajolery to blackmail in its drive to break up NATO and other defensive alliances. It has not hesitated to make naked threats of nuclear annihilation against country after country aligned with the West. This concentration of enemy effort should be sufficient proof of the critical importance, at our end, of strengthening existing alliances and winning new friends among the so-called uncommitted nations. Every affirmation of free-world solidarity is a body-blow to Soviet policy.

Millions of men and women on the dark side of the Iron and Bamboo Curtains hate their Soviet chains and their cause is therefore our cause. They are the secret legions of freedom deployed on farms and in factories, in schools and offices, in the Armed Forces and even in the ranks of the ruling parties, throughout the Soviet empire.

For many years we have seen the fateful contest between two worlds on which depends the future not alone of our own country but of the human race. On at least one front of this complex struggle, the one involving communications, I have been not only an onlooker but a participant. And it had seemed to me increasingly clear that the contest is essentially a war of ideas. Abstractly, this has been so widely acknowledged that it has the ring of a platitude. But concretely, we have not yet translated the platitude into policy and action of the necessary potency and on the necessary scale.

Because military forces and weapons in the hands of ruthless dictators represent a familiar type of menace, our people over the years have been more readily aroused to organize and sacrifice in this area. The ideological challenge seemed somehow too vague and esoteric to galvanize us into full action. The pervasive fear of nuclear war, in fact, fostered the delusion that we were enjoying peace, though in truth our world, our interests, our system of human values were under continuous assault.

No doubt it is true that "nobody wants a third world war." It is the kind of generalization, however, that breeds dangerous complacency. In effect it enables the communists to operate with impunity as long as their aggressions are too small in scope, and well enough spaced in time, to avoid the showdown. Moscow is too wise to risk a challenge so immense and alarming that free peoples will be shocked into armed resistance. Instead it spreads its challenge thin—in a series of moves, no single one of which would provoke or justify war. Yet the sum-total of seemingly minor and unrelated Soviet victories could amount to absolute defeat for the West.

It seems to me vital that we grasp two principles: First, the more "unthinkable" a final showdown becomes, the more successful the Soviets

will be in their strategy of nibbling on what remains of our freedom and independence. Second, the more terrifying weapons become, the more effective becomes the communist strategy of intimidation.

The Soviet empire is racked by inner pressures, problems and dangers. The enemy expertly exploits our internal tensions, yet his own tensions are vastly greater.

Soviet henchmen are caught in a dilemma. Their economy and the rise of a newly educated managerial class require some degree of personal freedom and initiative. But when the terror is relaxed, all the pent-up hostility of the people breaks to the surface in demands that threaten the survival of the regime. So their policy swings in panic between gestures of moderation and renewals of terror.

We cannot sit back and wait for communism to disintegrate from within. That would be to forget the time element. No, we must and can hasten the processes of disintegration with every resource at our disposal—moral, psychological, political, diplomatic, economic. We must make common cause with the millions of communist victims already our allies and draw tens of millions more into the alliance. We must increase pressures against the Soviets from every possible direction.

We must exert our best efforts to lead, and in all events not to fall behind in the race for weapon ascendancy. We must maintain well-balanced forces for air, ground and sea. We must resolve whatever interservice conflicts there may be in the field of ballistic missiles and related weapons, and speed up their development into operational forms. We must stimulate our promising young people to pursue courses in science, engineering and related subjects and increase their opportunities to obtain an education in these fields. The effectiveness of modern industry, as well as modern weapons, depends upon an adequate supply of trained man power. We must preserve our economic strength and maintain our financial stability. We must stockpile and protect the sources of vital strategic materials and help sustain the military health of our allies and friends. This is indispensable insurance.

We must have an informed public whose interest and criticism can be determining factors in the struggles we confront. The freedom to criticize is a basic and precious right of American democracy. But criticism, especially in the perilous times we face, should be constructive and not destructive. Where we do not agree with their policies or actions, we may criticize our responsible officials in government and urge our views upon them. At the same time, we must help our government to carry its heavy load of responsibility. We should support reasonable requests for appropriations that may be necessary to increase our national security. The patriotism of our people, the ingenuity of our scientists and engineers, the skill of our labor, the efficiency and productive capacity

of our industrial plants, and the dedicated men and women serving in the Armed Forces and in other branches of our government, make it possible for us to accomplish all these tasks and to maintain our power as the leading nation in the world.

To the Four Freedoms, I would add a Fifth—Freedom of Science. It is essential to the maintenance of world unity. Political and social limitations and expediencies must not fetter the application of scientific knowledge, nor stop the quest for it. Man must be free to think. Free to conduct research. Free to develop his ideas. Free to invent and to produce.

Physical power, by itself, is not enough. It must be accompanied by spiritual faith, political wisdom and human understanding. They must be so employed that the ideas and the emotions moving men become vital factors in determining the outcome of any conflict. This has been true, in varying degrees, throughout history. Today that truth is all-important.

The paramount problem of this historic period is the challenge to our civilization posed by world communism. It is spelled out on every front-page and in every newscast, in our national budget and taxation and in our diplomacy. It provides the acid tests of our institutions, our ideals, our spiritual values.

We did not seek the supreme challenge of world communism and would be much happier if it did not face us. In fact, most of us are bone-tired of the sound of Soviet Russia and its program of world communism, of Titoism, Maoism, Neutralism and the rest of that pestiferous complex. But in that fatigue lurks great danger—the danger of mistaking the shadow of solutions for their substance.

Until recently the free world indulged in optimistic expectations because of Moscow's supposed "new look" of moderation at home and smiles abroad. The general eagerness to find a magic short cut to world stability was so great, that it took courage publicly to question the slogans of "peaceful coexistence." Then came the dramatic events that ripped the smiling mask from the ugly face of communism, to reveal the same old features of savagery and deceit underneath.

History is compelling us to look again with open eyes and minds upon the rock-bottom realities of the struggle between world communism and freedom. The lurid flames helped us to see grim facts that had been obscured by wishful thinking and weariness of spirit. We saw more clearly that the communist menace cannot be wished away; that the values at stake must not be compromised because they go to the innermost core of our way of life; that in the last analysis there can be no enduring halfway house between good and evil.

There are those who would settle for a world permanently divided, half-free and half-slave. Even if such a compromise could be reached, it would soon enough prove a delusion and a trap. For while our side would abide by it—trustingly dismantling its defensive setup and relaxing its defensive alliances—the Soviet side would use it as a device to soften us for the kill.

We cannot in the long run remain uncontaminated when half the human race is festering with the sores of terror and torture, degradation and despair. We cannot remain indifferent to the menace faced by still free nations, or to the martyrdom of nations and peoples already in communist captivity. Such callousness goes against the grain of everything we hold sacred.

I believe we should face up to the dangers inherent in an excessive fear of war. That fear could cloud our judgment, dilute our policies and weaken our position. If the Kremlin leaders should come to believe that our dread of war is so overwhelming that they can undertake adventures in aggression without risking American interference, the catastrophe we seek to head off may well become inevitable. Both the Kaiser and Hitler touched off world wars in the firm belief that the United States would stand aside. Surely we cannot afford to encourage miscalculations of the same order on Moscow's part. We do not conceal our profound hatred of war. We are determined to exercise the maximum patience and wisdom to prevent it. But fear of war—the kind of fear that opens us to blackmail by threat of hostilities—is another matter.

Actually the Kremlin, though dedicated to a mad project, is not ruled by madmen. They value their position and their power too much to gamble them in one throw of the dice. They have resorted to war to achieve their objectives only against small countries, when they counted on swift and easy victory. Both by training and conviction they are revolutionists, with a flair for aggression by methods short of a shooting war.

Communist strategy is SIMPLE—Let me spell it out: *S* for subversion, *I* for infiltration, *M* for manipulation, *P* for penetration, *L* for liquidation and *E* for exploitation. Already that "simple" technique has made them the masters of one-third of the human race, with beachheads of power in most of the rest of the world.

What is the essence of Moscow's "simple" strategy? It is to keep the great democratic powers constantly off balance, divided among themselves and badgered by one crisis after another both at home and abroad. In these circumstances the least we should do, it seems to me, is to apply similar techniques against the communist sphere. Our opportunity today—and it may not return for a long time—is to exploit the palpable political, economic and social strains in the Soviet orbit as vigorously

as Moscow exploits every dislocation in our world.

I believe that neither we nor the Soviets will knowingly ignite the world war nobody wants. Yet the disaster may come by accident or miscalculation. The embers of local wars are smoldering in a great many inflammable areas. The communists, now as always, are using the bellows of their propaganda to blow up little fires into big ones—to provoke civil conflicts and guerilla warfare. And every such episode carries the threat of an unplanned world conflagration.

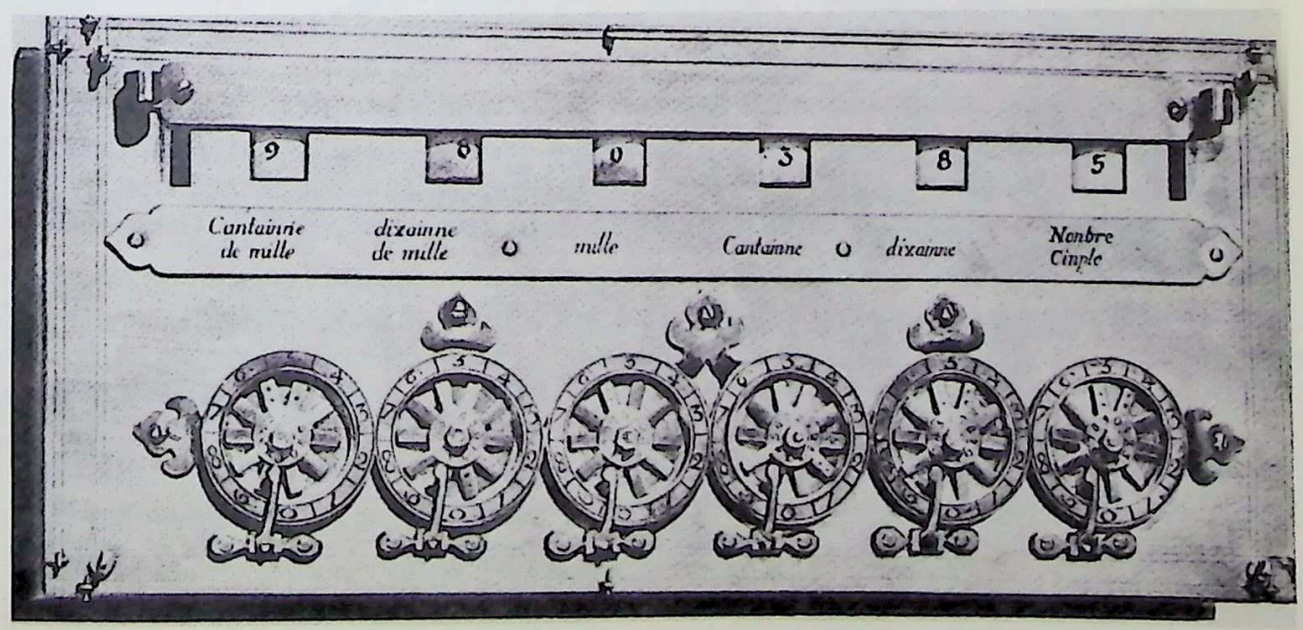
Our first and irreducible duty is to maintain military vitality and to maintain it continually "at the ready." This requires not merely the amassing of adequate weapons and the maintenance of well-balanced forces on land, on sea, and in the air, but the maximum efforts to win the race in science and technology on which they depend.

In the contest for the mind of man the enemy has sustained psychological defeats which, in their long-term effects, may be more disruptive than diplomatic or military defeats. But again, this does not justify any relaxation of our efforts. On the contrary, conditions at present are propitious for the West to take the initiative, with all the political and psychological forces at its command and others that must be created without delay. Precisely because communism has lost much of its appeal we should pursue resolutely the enlarged opportunities for disseminating the truth, for reflecting our moral courage and for exercising our statesmanship.

*Eleanor Roosevelt, representing the Editors of Wisdom, personally presented the first copy of the special India edition of Wisdom Magazine to her lifelong friend, Jawaharlal Nehru, Prime Minister of India. The issue paid tribute to Nehru for his wisdom, his tremendous accomplishments in India, and for his notable contributions to world peace and understanding.*

# THE WISDOM OF SARNOFF ON *Automation*

*The urge to find instruments which would help man to calculate is as old as man himself. In 1642, faced with the labor involved in interminable administrative calculations, Blaise Pascal (1623-1662), the brilliant French scientist, philosopher and mathematician, took the first real steps toward the science of automation. He conceived the idea of converting mental and manual calculation into mechanical calculation. His ingenious arithmetical machine (shown below) introduced the "automatic carry-forward" principle. It consisted of a series of wheels, each divided into nine sections and numbered from zero to nine like a telephone dial. The wheels were connected in such a way that the complete rotation of one of them caused the wheel on the left of it to move forward by one digit. The result of the operation could be read off on the square above. This is the principle which was to govern all subsequent automatic calculating machines. The mechanical computer was fourteen inches long, five inches wide, and three-and-a-half inches high. Pascal's seventeenth century invention shows the technological revolution which the machine embodied: the possibility of infallible calculations and the replacement of human mental processes, and the possibility of entrusting the computer to persons who did not fully understand how it worked.*



Automation is moving ahead in business and industry at a constantly quickening pace not only in America but also throughout the world. It is now widely recognized as a significant means of accelerating the entire industrial process, relieving humans of repetitive tasks, routine decision-making, and control functions, and handling information at enormously higher speeds and with vastly greater accuracy.

While automation's long-range benefits are generally acknowledged, its short-range dislocations have provoked spirited controversy and given rise to concern among workers and their families. This concern has been deepened by growing unemployment. When the national economy is on the upsurge, automation can be effected with relative ease; but during a period of economic softness, the tensions of transition are magnified.

A plan for dealing with automation should relate to a method of protecting those who are displaced by automation for a long enough period of time and under proper conditions to give them a full opportunity to be placed in other segments of the American economy. In essence, the problem is one of adjustment: How can our industrial society adapt most effectively to the far-reaching changes which automation is bringing about in our national economic and social structure? In the whole broad range of domestic problems, this one stands out as distinct and different—in its immediacy and complexity, in its economic challenge and social impact, in its compelling demands on our vision and leadership.

More and more leaders in diverse fields are addressing themselves seriously to the problem of automation. Their comments point up the fact that it is an issue which impinges not on just a few selected areas but on a widening spectrum of our national activity. Its many-sided impact appears to be growing ever stronger and more pervasive. This trend is underscored by the scope of the questions being raised in connection with automation. An enormous number of factors are involved.

Will the higher productivity resulting from automation be translated into unemployment instead of into higher living standards? Many responsible leaders of organized labor have given voice to such fears. Management spokesmen have countered with impressive statistics to demonstrate that automation has actually spurred employment in areas like petroleum and telephones. They have insisted that, without automation, the coal industry would long ago have succumbed to the competitive thrusts of alternate power sources.

What can be done to encourage displaced workers to move to other geographical locations where job prospects are more promising? The traditional pattern—shaped in part by union work rules, in part by enduring family ties—has been for idled workers to remain where they are and collect unemployment compensation until new jobs turn up. Is it desirable now, as some have suggested, to provide funds that would enable

workers to respond to changing opportunities? If so, where does the prime responsibility rest for taking the initiative in this matter?

Is it true, as Dean Gordon Brown of M.I.T. has said, that automation involves "an intellectual revolution—the human being has to become smarter?" If so, would it be feasible to establish a nation wide system of weekly training allowances? Under such a system, displaced workers might be paid for going to school and preparing themselves to move into upgraded positions in an automated industry.

How, without widespread automation, can the United States offset the lower labor costs of Japan, West Germany and other countries, and maintain its competitive position in the world economy? Western European nations are automating their factories because of their need for output greater than their labor force can produce. If they automate more rapidly than we do, will they not acquire a decisive advantage in the international market place? How much of an increase in the national economic growth rate could be achieved with, say, a ten or twenty per cent step-up in automation? Is the extensive application of automated techniques to industry and commerce a requisite for continued rises in our living standards?

The folklore of automation is replete with conjectures, theories and hypotheses; but the facts are appallingly scant. One business magazine concluded from a special survey that "automation is about ninety per cent emotion and ten per cent fact." Yet getting the facts is the indispensable first step in setting constructive policies that will help the nation adjust to the widening impact of automation.

The late President Kennedy put the issue of automation in sharp focu some years ago when he said: "If the vision of a stronger and more prosperous America is to become a reality—if automation is to be the key to a brighter future rather than the forerunner of economic distress—then labor and management and government must work together to ease the inevitable dislocations and hardships which this new industrial revolution will bring."

As an initial step to solving the problems of automation, I would suggest that a high-level, non-partisan commission—composed of representatives of labor, management and government—be set up to conduct a comprehensive study of automation and its manifold implications. The purpose of this study would be to place in clear perspective the role of automation in our industrial society, and produce a long-range program for its effective development.

A commission on automation could evaluate the work that has been done so far, and determine precisely where we stand now. It could stimulate additional research in areas where that is required to develop all the

pertinent facts. It could project current trends, five, ten, or twenty years into the future to determine what kinds of skills will be required then, and to what extent we should be laying the groundwork now. It could dramatize to the nation the urgent need for a planned approach to the problem. Past experience suggests that once constructive national thinking has been stimulated, sound solutions will be forthcoming.

Replacing workers on their present jobs with machines is not the major function of automation. Its greater promise is its ability to do new things, to create new products, new services and new jobs, and to meet the increasing requirements of a growing population.

The key to America's economic strength, through the years, has been its sharply rising productivity. In our efforts to continue and accelerate this rise, automation is a vital asset. If it is handled effectively, it offers the stimulating prospect of greater security, wider industrialization, a higher standard of living, and a better and happier life for millions of our citizens.

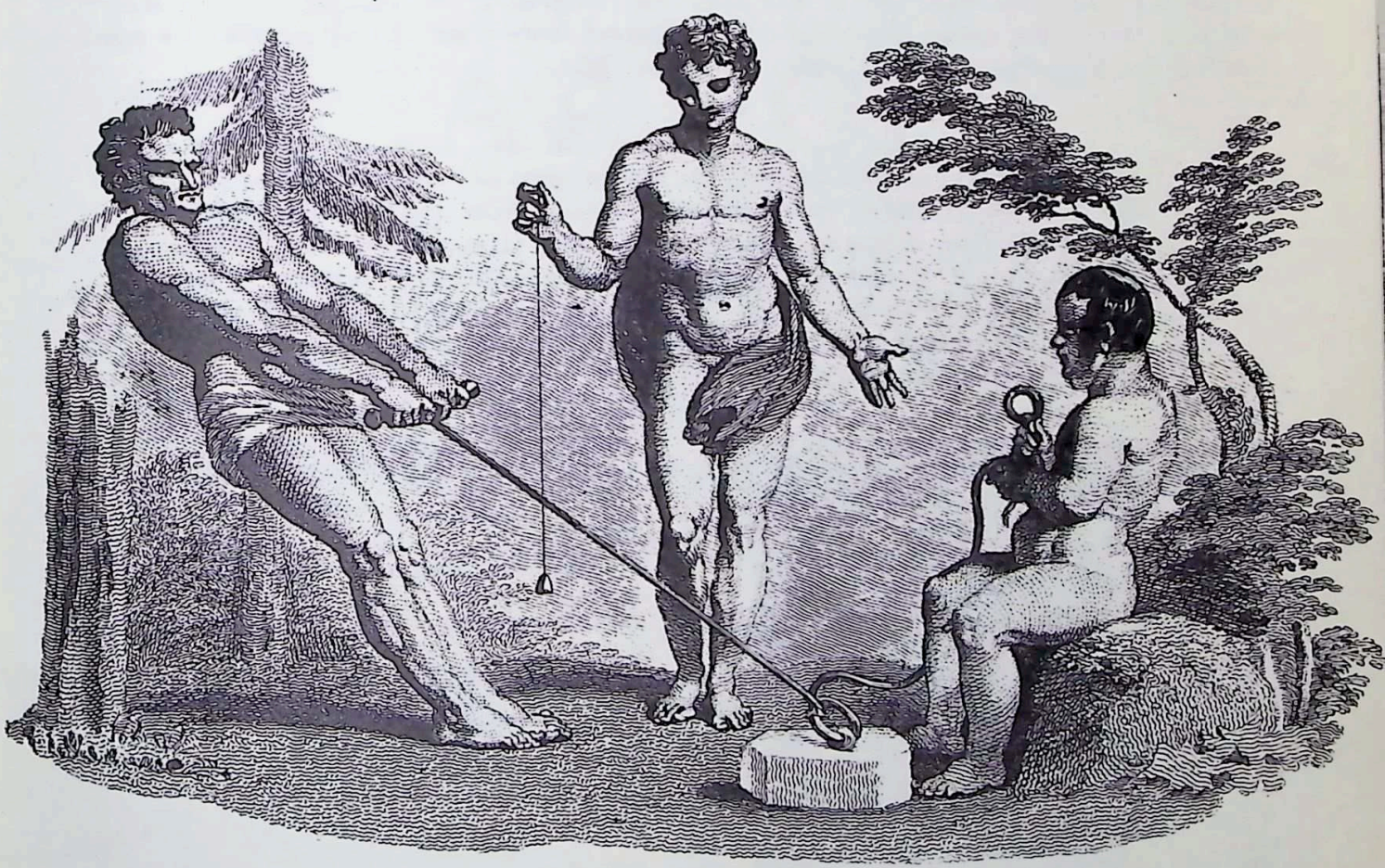
In the long run the offsets to the adverse effects of automation will depend upon the growth pattern of the American economy. If the growth trends of the United States prove adequate, the economy should be able to absorb the results of increased productivity of both industry's activity and man's fertility. If the growth factor is not adequate, our problems of employment and economic prosperity will be compounded. Therefore, it becomes essential to direct intensive analysis to the problems of growth and to formulate procedures which will promote adequate growth. One way to advance "growth" is to stimulate the creation and development of new industries. The government can be very helpful in this respect by providing proper and adequate incentives.

In our approach to automation, we might do well to recall the admonition of Abraham Lincoln a century ago in the darkest days of the Civil War. "The dogmas of the quiet past are inadequate to the stormy present," he wrote. "We must think anew and act anew." So, now, must we "think anew and act anew." If we act wisely on automation in the present, we need have no fear of the future.

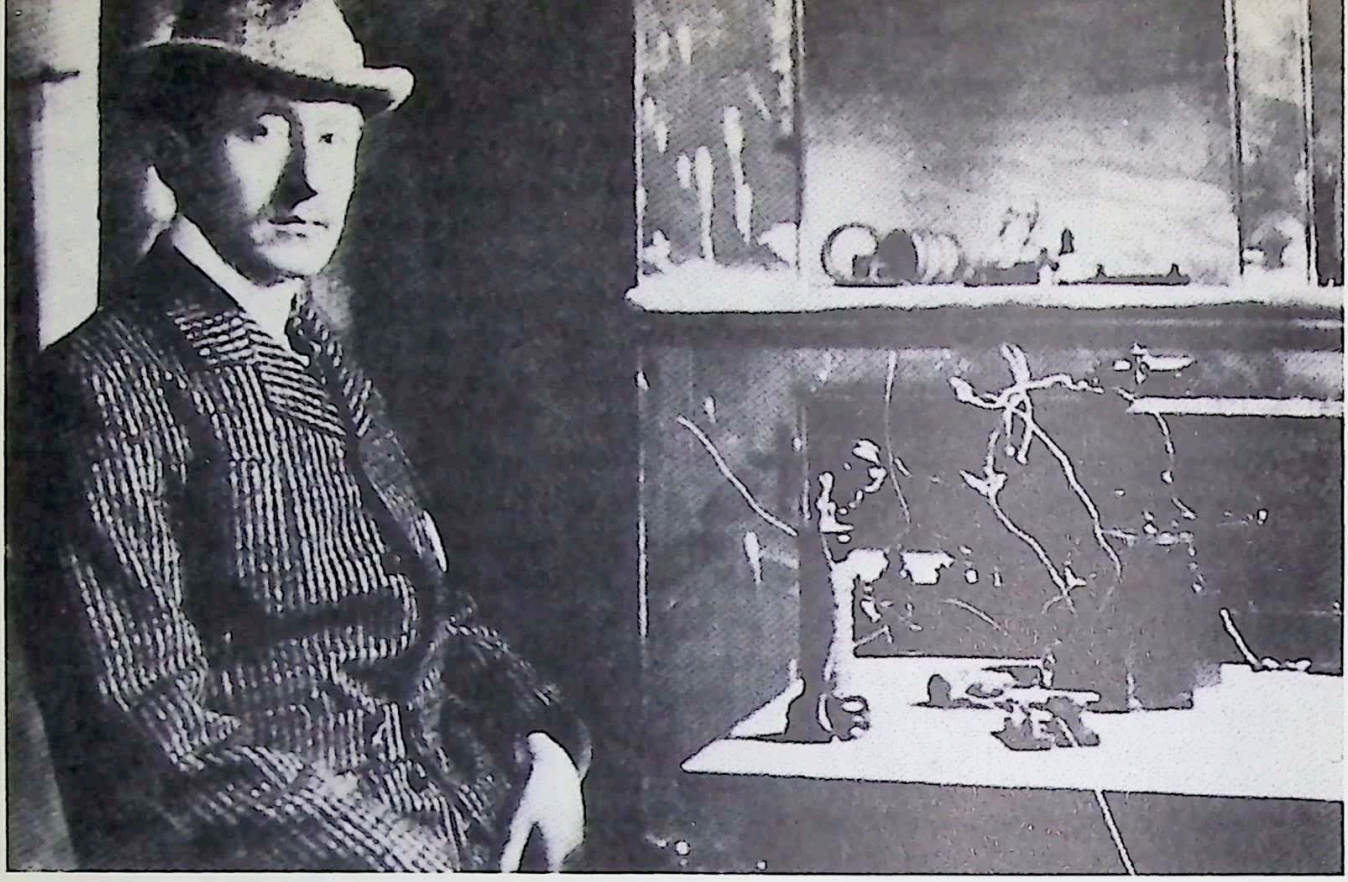
We are now witnessing a new era, which we call automation. Electronic machines will not only compute, remember and file information, but will perform many routine tasks. This will open the way for establishment of new businesses and new opportunities. Manufacture, in particular, will draw heavily upon electronics in the future. Electronic equipment and controls will handle much of the routine labor in the extraction, fabrication, quality checking, and transportation of raw materials. The manufactured articles may be stored systematically and inventoried accurately by electronic means. Routine steps in commerce, such as accounting, billing and collection, are capable of electronic handling with high speed and accuracy.

I am not among those who are frightened by the advent of automation. I have no doubt that ultimately it will operate to enrich human existence. Far from causing unemployment, automation will, in the long run, provide more and better jobs. It will raise standards of living to greater heights and give more people larger margins of leisure. It will stimulate new demands for products and services throughout the world by hundreds of millions of people now stuck in the swamps of poverty and drudgery.

In the atomic-electronic age, man's hunger for freedom and social justice, for beauty and inner spiritual grace, is as keen as ever. Robot brains and technology cannot satisfy that divine hunger which must seek its sustenance in the larders of religion, art and culture. As a nation, we require not only more "man power" but more "mind power." Machines are no substitute for minds. A calculating machine can carry out certain functions with phenomenal speed and accuracy, but the most fabulous "electronic brain" is no substitute for thinking. Even more important, no matter how we may perfect machines, they cannot provide the factors that count most in human society—character, integrity, moral perceptions and spiritual vitality.



*Archimedes (left), born of Greek parentage in 287 B.C., was the greatest scientist, mathematician and inventor of the ancient world. He formulated exact laws and tested them just as scientists do today. He founded the science of hydrostatics and mechanics. He built a planetarium. And, in mathematics, he made many important discoveries. In addition to formulating the famous Principle of Archimedes—the physical principle of specific gravity—he worked out the principle of levers and pulleys and their use to multiply effective force. Talking to Hiero and Galo, he boasted that he could move any weight whatever, given a long enough lever and a proper fulcrum. "Give me a place to stand on," Archimedes cried, "and I will move the earth."*



*Guglielmo Marconi, inventor of the wireless telegraph, the radio magnetic detector and the horizontal radio direction aerial, shown here with the apparatus he used to receive the first transatlantic radio signal in 1901.*

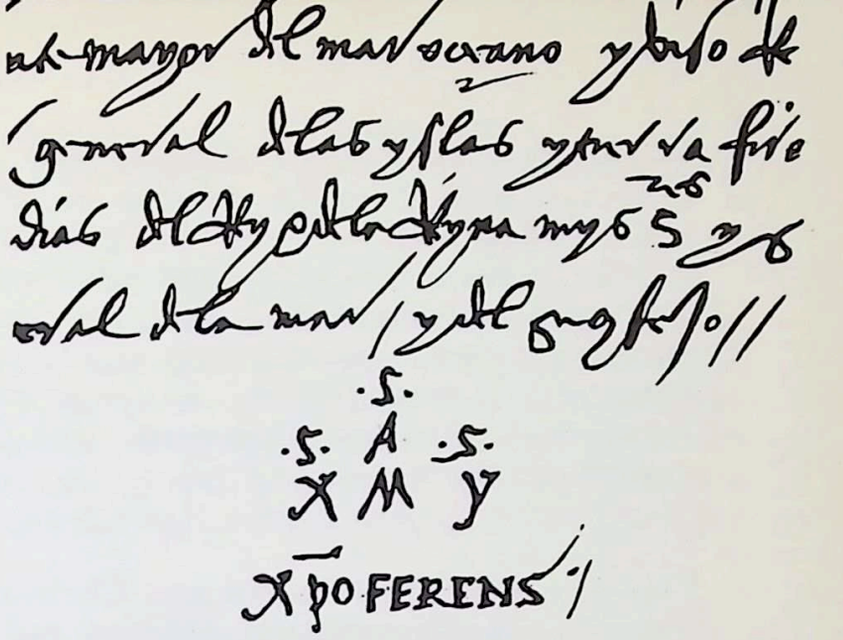
I congratulate David Sarnoff on his success in the development of the American radio industry and world-wide radio communications. His first connection with radio was in association with me. I rejoice over his amazing career, and from the very bottom of my heart wish him more years of well-earned happiness and prosperity and equally brilliant service in the interest of commerce, industry and advancement of science.

G. Marconi

GUGLIELMO MARCONI

*General Sarnoff conversing with Marchesa Marconi in Rome during a Marconi Commemorative Luncheon held in 1951 in New York. Sarnoff, who started with Marconi as his office boy, later became his co-worker.*

*Christopher Columbus (1451-1506), discoverer of America.*



*Excerpt from a letter from Christopher Columbus to the Bank of St. George in Genoa; April 2, 1502.*

# THE WISDOM OF SARNOFF ON *Columbus And Marconi*

*First landing of Columbus on the shores of the New World, October 12, 1492.*

It was my good fortune to know and work with two of Italy's most illustrious sons. First, the famous son of science—Guglielmo Marconi. When we first met, I was the office boy in his American wireless company. In later years it was my proud privilege to see our acquaintance ripen into intimate friendship. I was also privileged to enjoy many years of association and friendship with another great Italian—Maestro Arturo Toscanini. It was through the magic made possible by Marconi that Toscanini's incomparable music was carried to immense audiences throughout the world.

The two pioneers, Marconi and Christopher Columbus, have much in common. The discovery of America and the discovery of wireless, four centuries apart, both marked climactic moments in human history. Both immeasurably widened man's physical and mental horizons. Columbus annihilated an ocean and opened up a new world of geography. Marconi annihilated space and opened up a new world of communications.

I shall always remember an occasion when I was with Marconi on board his yacht, the "Electra." We were experimenting with short waves, endeavoring to establish communication with Australia from the English Channel. It was five o'clock in the morning when we finished our experiments for the day. We were about to retire when he said to me: "David, there is one thing I would like to know before I die—I know how this thing works, but I would like to know why!" Like many before him, he died without an answer to his question. We still do not know the answer to this and similar questions.

It is no accident that both Marconi and Columbus were Italians. Their names, on the glorious roster of that country's immortals, dramatize the fact that for over 2000 years the unique genius of Italian people has illumined the whole civilized world.

If, as has so often been said, all mankind is in debt to Italy, America is especially aware of the magnitude of that debt. After all, it was our America that Columbus discovered; and it was in our America that Marconi's invention saw its greatest development. These are among the numberless bonds that join these two nations not merely in friendship but in the deeper community of shared cultures and shared ideals.

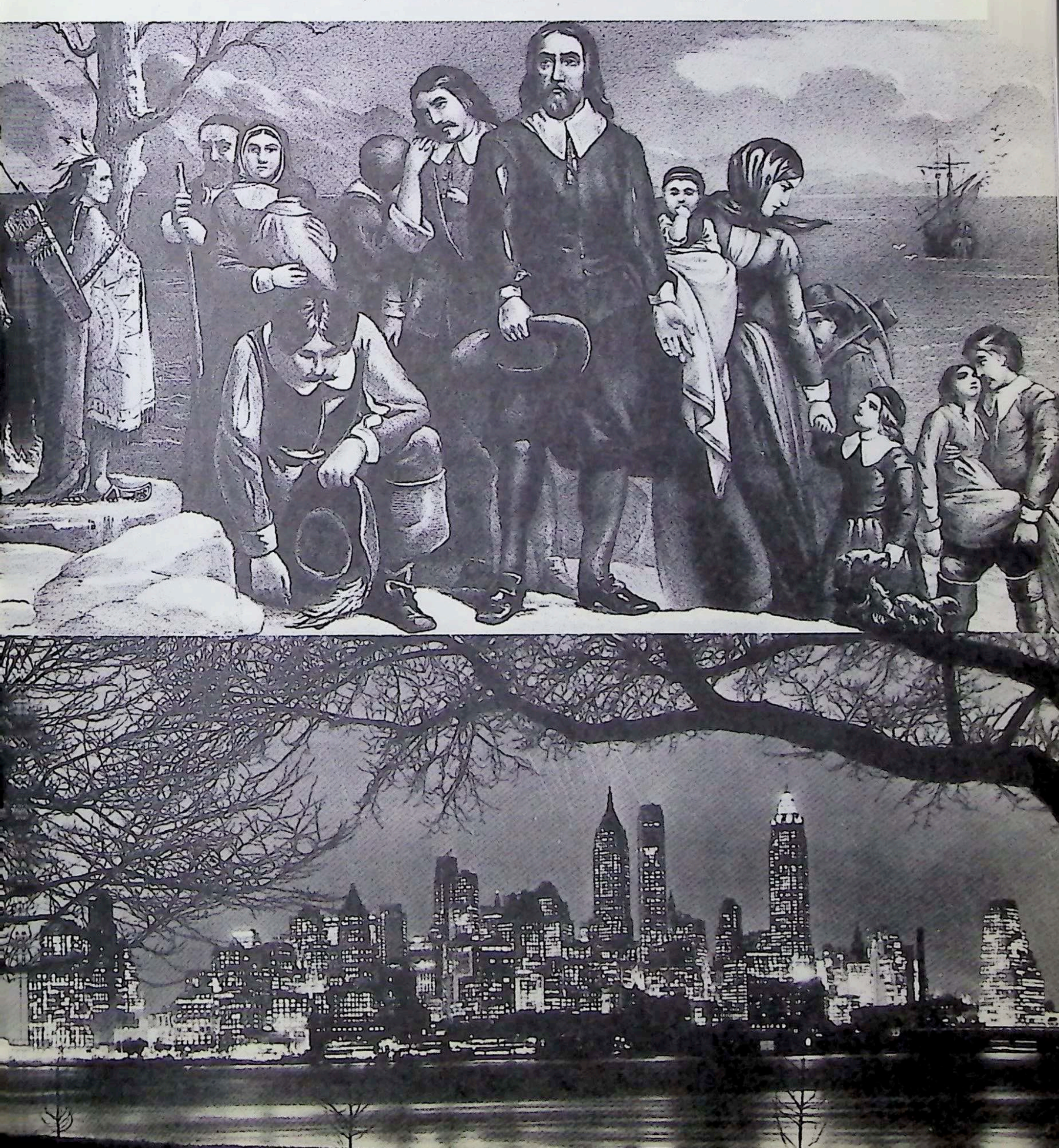
Through the generations, millions of Italians have migrated to the United States. Their labor and brains and talents are woven into the fabric of American life. They and their progeny have become good Americans—but without ceasing to be good Italians.

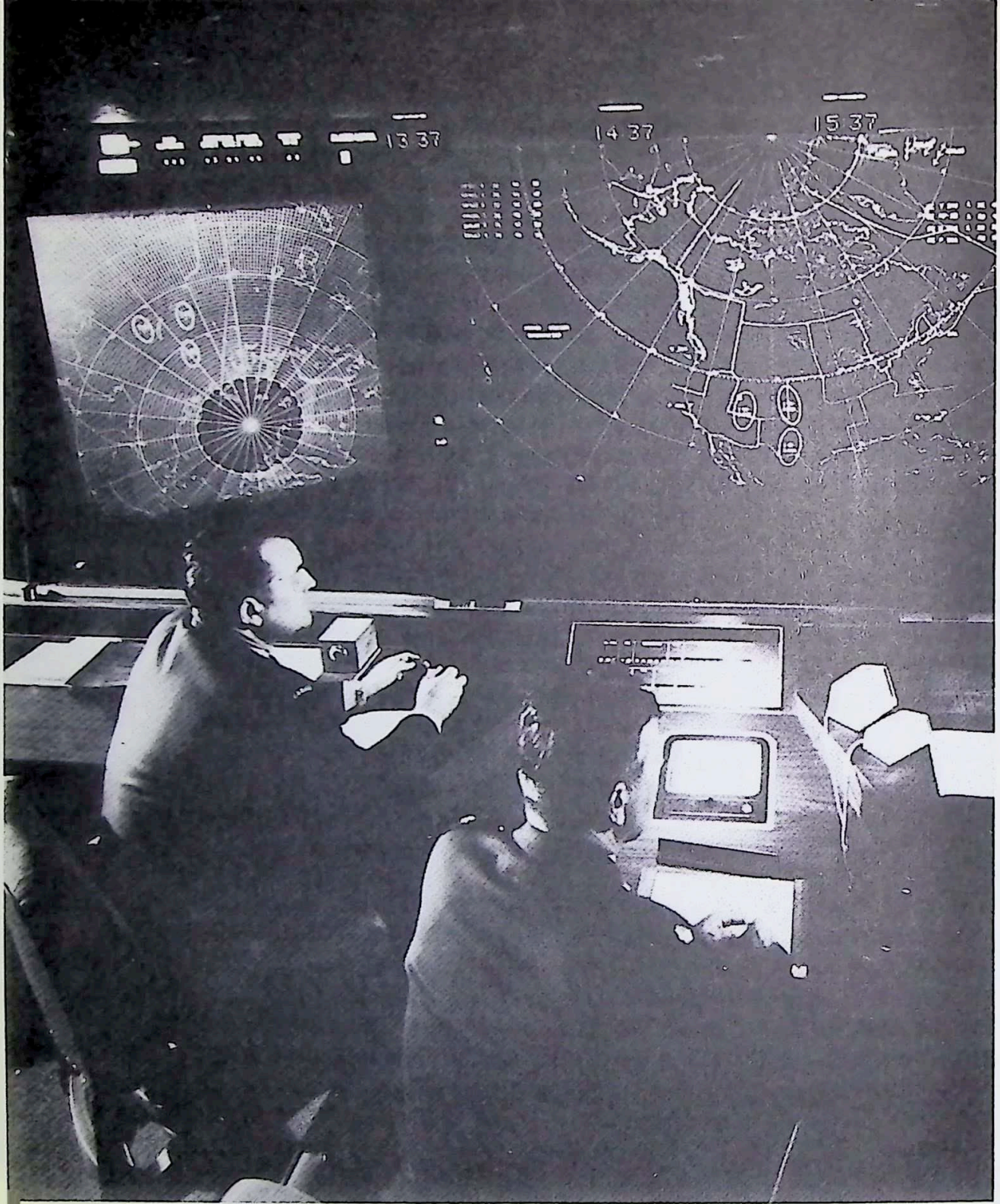
It was the destiny of both Columbus and Marconi to remove natural barriers to the movement of men and ideas between nations and peoples. Unhappily, that movement is still blocked by artificial barriers. Though

we travel with the speed of sound and communicate with the swiftness of light, mankind still remains divided by oceans of misunderstanding and ideology.

Our paramount need today is for Columbuses and Marconis of the human spirit, to help close the gap between technological and moral progress. This is the challenging problem of our times that all of us must strive to solve. We hope and pray that the human intelligence which has produced the wonders of science and technology will also find the wisdom to utilize them for peaceful and constructive purposes, and for the benefit of all mankind.

*The landing of the Pilgrims at Plymouth, Massachusetts, December 22, 1620. (Below) New York City skyline, 1968*






# THE WISDOM OF SARNOFF ON *Communications*

All the developments in communications—since Morse invented the telegraph, and since the first cables were laid, and Marconi invented wireless, and others built on top of that—all of them, in my mind, will prove of much less importance than the developments which are bound to come, not only in the next fifty years, but I might say in the next twenty years, and possibly even within the next ten years.

In an industry such as electronics, the prospects are almost limitless. We are in the communications business, the business of conveying messages to the human brain. No man is wise enough to know which avenue to the brain is best. Therefore, the sensible idea is to make all avenues available for carrying the message—whether it be a message of religion, education, entertainment, news, or whatever information the instrumentalities can carry and deliver to human beings.

The historic progress of communications parallels man's advance on this planet. The first communications were sight and sound, man-to-man, over distances of only a few feet. Since then, our primary effort has been to extend that distance. We achieved the earth-bound ultimate when we projected man-to-man communications, both sight and sound, to any place on earth, regardless of distance. And we achieved the universal ultimate when we began exchanging communications over distances of millions of miles.

In its own way, every communications advance has moved us nearer the ultimate goal. The Greek, Roman and Aztec relay runners contributed to the stretch-out; and so did the shouting sentinels on Caesar's battle towers, the homing pigeons used at Waterloo, the primitive semaphore employed by George Washington who placed a barrel, a flag and a basket on a mast and then issued orders to his troops by altering their relative positions.

In the present century, the great stretch has come through applications of radio communication. In its first phase, it enabled communication between a fixed point on land and ships at sea and between ships themselves, or between two land areas across the ocean barriers. The second phase brought the human voice and instrumental music to millions of listeners through radio broadcasting. The third phase brought the stretch-out of sight, first through black-and-white television and now through color.

Vast progress has been made in the art of communications but there are many more promising prospects ahead. The sound of the human voice can be projected directly and almost instantaneously to any area of the world. We have extended sight, by television, so that the people of a nation, or a group of nations, can see the same picture simultaneously. In fact, we have achieved global television as well as other forms of world-wide communications through the use of relay satellites orbited in space.

The challenges facing us in this area are no longer how; rather they are what form of control and what character of international traffic?

Satellites expand, broaden and speed up the services we have today and make them available to places and people that did not have them previously. In the transmission of intelligence, a communications satellite is basically a distance booster. It is as if we picked up a microwave tower from the ground and hung it in the sky. This increases enormously the range over which communications can be sent and received.

The price for achieving communications advances will come high—in dollars, in planning, and in work. We have the scientific manpower and know-how to meet and to surpass any Russian challenge in this area. But something else must accompany it: a firm national resolve to do whatever must be done to assure our ultimate success.

We must understand and properly evaluate the objectives of the potential enemy. Years before any Western nation, the Kremlin accurately assessed the psychological and propaganda values of space probes. The Communists recognized that breakthroughs in technology, a field of traditional American primacy, would have direct political impact in terms of fresh prestige for them, and that it would cause an erosion of morale among the Western allies. In Moscow, missiles and satellites were woven into the broad tapestry of party dialectics. In Washington, they were evaluated exclusively in the context of their scientific or military significance. The result, from the psychological and propaganda standpoint, was that the Communists seized the priceless advantage of the initiative. They acted. We reacted. They were first with Sputnik, first with a moon probe, first with a man in space.

In communications, we possess the initiative and leadership from automation to satellites. Yet, this unbroken continuity should give us no cause for complacency. "The minute you get satisfied with what you've got," Kettering once said, "the concrete has begun to set in your head." In terms of our nation's leadership posture before the world and our national policy of advancing the cause of peace everywhere, there is too much at stake here to permit any concrete to infiltrate our communications arteries.

It is my conviction that America can continue to lead in the vital communications field, and that we can complete the cycle by which man will communicate with man, directly, wherever he may be. I also believe that by the time this is accomplished, it will be possible to achieve automatic translation of languages so that when we speak to each other we will understand each other.

Creativity has a special importance for the subject of communications.

The origination of a thought, a fact, a concept does not occur in a vacuum. It takes ideas to beget ideas, and for this the mind requires a constant nourishment of information from other sources. The purpose of communications is to make possible this feeling of the mind.

An act of creation is without use or significance unless the facilities exist to communicate the knowledge of that act. The two vast continents beyond the far horizons of the Atlantic had no reality for Europeans until Columbus communicated their presence. Before Livingstone revealed its existence in the last century, the majestic Victoria Falls went tumbling, unheard and unseen by white men, into the Zambezi River. To all practical purposes, it might never have been there.

Creativity is not possible without information coming in, and it is not purposeful without information going out. And this two-way flow can occur only through the channels we establish for communications. The type, the capacity, the range of our communications bear a direct relationship on the entire process of human advancement.

Today, we are on the threshold of breakthroughs in communications that will liberate the creative powers of the mind on an almost limitless scale. They will, at the same time, extend its reach beyond present boundaries of space and time.

When I contemplate the future, it is with the same feeling of awe that Balboa must have experienced standing on a mountain peak and viewing the limitless expanse of a new ocean. Only thirty-three years from now, when a new century dawns, we will be citizens not only of a nation and of a world but probably also of a communicating planetary system and conceivably even of a cosmic society.

It took many thousands of years for mankind to advance into the industrial era, which began less than two centuries ago. In the brief moment of history since then, progress has come with headlong speed and in progressively shorter intervals of time. The electric and the air age began at the turn of this century. Only twenty-five years ago, the atomic age was born. Today, we are in the tenth year of the space age.

In communications, it was only at the turn of this century that Guglielmo Marconi spanned the Atlantic with three faint dots—the letter "S" in Morse code—enabling man for the first time to communicate over long distances through the air. Barely twenty years ago, the transmission of moving images through space was in its infancy, and transoceanic telephony depended entirely on the inadequate service of short wave radio. Indeed, so frequent are the changes, and so fundamental, that we can sympathize with Mrs. Einstein when she was asked whether she understood the intricacies of her husband's theories on the cosmos. She

replied: "I understand the words but I don't always understand the sentences."

Radical change was the hallmark of the industrial revolution—yet we managed to adapt to it successfully. We have reconciled ourselves to the startlingly different concept of the atomic age. We are beginning to master the complexities of the space age and all the novelties it embodies.

Each period of change has involved physical events. They have extended the power of our muscles. Their principal effect has been to multiply our capacities to build, to make, to move. But what is occurring in communications represents change of a far different character from any that mankind has as yet experienced.

We can expect the revolution in communications to extend the power of our brains. Its ultimate effect will be the transformation and unification of all techniques for the exchange of ideas and information, of culture and learning. It will not only generate new knowledge, but will supply the means for its world-wide dissemination and absorption.

The instrument that is leading the way in the communications revolution hovers above the equator at a fixed point more than 22,000 miles in space. It is a synchronous satellite, known as the *Early Bird,* and it provides intercontinental commercial service in telephony, telegraphy, and television. It is the electronic symbol of a time, now swiftly approaching, when channels through space will become major arteries of world communications, and particularly in the transmission of television.

Television has already brought the surface of the moon into the living room. Electronic photography, sensing devices, and modern communications have given us an insight of the nearby planets. We communicate with orbiting astronauts in space almost as readily as with an associate in an adjoining office. Through our initial efforts in space communications, it has become possible for millions on both shores of the Atlantic and Pacific communities to view and listen simultaneously to each other's leaders, to see important events at the moment they occur, to examine each other's national treasures, and to exchange man-in-the-street opinions on subjects of topical importance.

The way is opened technically for the establishment over the next few decades of a communications system by which governments, organizations, or individuals may establish contact with anyone, anywhere, at any time—by voice, sight, or document, separately or in combination. When this occurs, man's capacity to communicate will have transcended every barrier of time and distance. A person sitting in his home or office, or in movement, will be able to see or be seen, speak or be spoken to, by any other person anywhere in the world. Written information, com-

puter data, and facsimile will be capable of instant transmission from point-to-point over any distance. Today, progress in electronic communications is opening up microwave frequencies that can provide millions of channels for such messages.

Recent research has tapped a great communications resource with the development of the laser beam of light. A laser beam travels in a straight line for hundreds of thousands of miles. It can concentrate a signal capacity a million times greater than in all of the communications channels in use throughout the world today. Lasers promise an effective link through space as human exploration extends to the moon and beyond. They offer a potential vehicle for extending global communications to tomorrow's outposts elsewhere in the solar system. When that happens, the parent of tomorrow's college student may get a vacation call from the far side of the moon or Mars instead of Daytona Beach, but two similarities will remain—it will be to ask for money, and the call will come collect.

In the unfolding of the communications revolution, the ocean-spanning satellite will serve as the principal catalyst. I believe that the first phase of its impact, which is nearly at hand, should see a global system of synchronous satellites each of which would be within direct line-of-sight range of about one-third of the inhabited globe. Three of them used simultaneously can thus cover the entire globe. Communications to and from these satellites will be handled through high-power earth terminals linked with land-line and microwave networks crisscrossing the continents. With these facilities, communications could develop to the point of fixed telephone dialing between users anywhere in the world. The system would also accommodate television broadcasting and closed-circuit television.

The next decade, may mark the beginning of international satellite communications between any two cities rather than through national terminals. Nuclear-power synchronous satellites would permit substantial reductions in the cost of the earth terminals, placing them within economic range of small nations and users. With such stations, the larger population centers could readily undertake their own direct communications via satellite relay. For example, a direct link could be maintained between St. Paul and Casablanca, employing simple base stations at or near each city. Person-to-person voice communications could be provided through fixed or mobile telephone and even pocket-radio links between individuals and the earth terminals. When this happens, an individual moving within a city or its environs could communicate with any similarly positioned and equipped individual on any continent.

The latter part of the century should see direct personal transmission of voice and sight through satellites without intermediate routing. These would be manned satellites, assembled in space. Nuclear energy in the space station would provide up to one million watts of power, equal to

David Sarnoff should be ranked with the great builders of America, for he stands among our noblest and best minds. A man of intense convictions, remarkable versatility and unusual creative force, his brilliant work in the fields of radio, television, communications and electronics is tremendous, and his influence is correspondingly great. A liberal thinker who is intensely individual, strikingly original, and highly imaginative, greatness shines from all his achievements for he has given to his work his best hours and his best years. His vast contributions to the world are not only great histories of a memorable era, they are magnificent monuments to his unconquerable will and uncompromising spirit.

WALT DISNEY Walt Disney

*Producer and President, Walt Disney Productions*

the output of twenty high-power present-day broadcasting stations. Equipped with a high-speed computing system, the satellite would serve as a switchboard in space to route calls from city to city, country to country, and continent to continent. With this system would come direct two-way contact through television receiver-transmitters installed in private homes and offices. Beyond this, a new dimension in individual communications might lead to the incorporation of television as well as sound in a two-way pocket-size device. This would be equipped with a decoding circuit responsive to one code out of several million possible arrangements of pulses transmitted from similar units elsewhere in the world. At this point, personal global communication would be as commonplace as dialing a friend on the other side of town.

Whether or not the potentialities of technology are pushed to their full extent, progress in the satellite communications technology is far more rapid than was first anticipated. For example, only five years ago, it was assumed that cost and technical complexity would make impractical more than a single satellite global system to serve all countries for the foreseeable future. That assumption has already been invalidated.

Technology is moving so rapidly that the establishment of a satellite service has now come within the economic capability of many nations. Through a single transmitting and receiving ground station costing approximately five million dollars, any nation can have access to a satellite linked by sight and sound to any other nation similarly equipped. Apart from launch expense, the cost of a satellite itself may be as little as one million dollars. Already, the Soviet Union is operating a prototype satellite communications system of its own.

Within five to ten years, I believe that we will develop high-power broadcasting satellites capable of transmitting television and radio directly into the home These would be synchronous satellites radiating up to thirty kilowatts of power, sufficient to transmit simultaneously on three television and three radio channels to home receivers within an area of one million square miles. A special low-cost home antenna could be provided to receive such transmissions in the ultrahigh-frequency band. To provide continuous service, three satellites would be required. A stand-by unit would be placed in orbit beside the operating satellite in the event of failure. A third satellite would be kept in readiness for launching should either of the first two fail to operate. The cost of such a three-satellite system would be far less than the establishment of a conventional communications network covering a large area such as South America, or nations such as Indonesia or Brazil. It would enable the remotest village to be linked to major industrial and cultural centers. It would give less developed areas access to the same communications technology that the industrial powers enjoy.

To the advanced nations, satellite broadcasting will open broad new avenues for direct sharing of information, ideas, and cultures. To the

developing nations, they will provide instruments of tremendous power for education, knowledge, and self-expression.

It should be relatively easy to design and produce low-cost, single-channel television receivers for use in primitive or underdeveloped areas of the globe. They could be made to run on batteries rechargeable by wind, hydraulic, or even animal power. Such sets could be distributed throughout the developing regions in quantities suitable to local conditions. If they were programed from regional stations transmitting through a few broadcasting satellites, the tragic effects of illiteracy could be virtually abolished in ten years.

It is an exciting thought that millions who have never seen a train, an automobile, or telephone may make their first contacts with the wider world through television via outer space.

Direct broadcast satellites will alter the entire pattern of relationships in international communications. And their operation will obviously involve far more than simple positioning of the satellites in orbit. When many nations possess the capability for transmission through space to any place on earth, they must agree to a new pattern of global regulation. Otherwise, the prospect of social and economic gains will be thwarted by the ensuing chaos in the world's airwaves.

When a Russian satellite can broadcast directly to a Kansas farm, or an American satellite can broadcast directly to a Hungarian collective, what will be the reaction in both countries? When we can reach the homes of the world with instantaneous sight and sound, what rules of conduct are to apply? And who is to establish them? These questions evade the jurisdiction of any established body, yet will affect the welfare of all nations and all people.

If direct satellite broadcasting is to fulfill its destiny, I am convinced that some type of *modus vivendi* must be established among the many rival national and ideological interests. It would be a travesty on the hopes of humanity if this immense force for enlightenment, understanding, and social advancement were to be subverted to narrow national ends, or become discredited by the failure of nations to agree upon its beneficial uses.

It seems to me that we should begin to concern ourselves with an examination of the broad fields of subject matter that might be acceptable to all nations and peoples, prior to the orbiting of the first direct broadcast satellite. In the field of culture, even in the midst of national rivalries, an interchange of art forms continues to grow—in painting, in music, drama, ballet, and the folk arts. All of these are readily transferable to the medium of global television. And all strike a chord of response

in civilized man regardless of his nationality or ideological allegiance.

Whatever our personal loyalties, there are certain types of major news events and occasions that move us all to wonder and pride. For example, the first astronaut to set foot on the moon will place man on the threshold of a world far vaster than anything discovered in the age of Columbus and Magellan. Happenings such as this transcend all national boundaries and it should be possible to reach a broad consensus on what could be broadcast to all people everywhere.

The use of global satellite broadcasting as a direct channel of communications between nations, might ultimately lead to summit conferences in which the principals would confer face-to-face without leaving their capitals. If closed sessions were desired, the transmissions could be scrambled and decoded by special equipment at each terminal, comparable to today's "hot line" between Washington and Moscow. If no need for secrecy existed, the conferences could be available for all people to see and hear.

Perhaps an agreement could be achieved that one channel in each global space system would be allocated for the deliberations of the United Nations. It might not always be a placid picture that humanity would view, but it would mirror society through the only world forum where all ideas are publicly exchanged and debated. Global television by the United Nations would help at least to create an understanding of the issues involved and thus further the cause of peace.

The greatest promise of direct satellite television rests on its ability to educate millions simultaneously—to bring people everywhere into instant contact with technological and social progress. The prospects for educational programming by satellites are virtually limitless. And they offer, perhaps, the greatest hope for advancing the world to a higher plateau of understanding and peace.

If we can achieve broad agreement in the fields of subject matter that might be acceptable to all nations and peoples, it should not be beyond our ingenuity to devise arrangements for utilizing all satellite broadcasting facilities on suitable occasions as a world network serving the interests of all nations. Inevitably, as the world continues to grow smaller in distance and time, I believe we will find more things to unite rather than to separate the community of man.

A communications development that stirs the imagination as much as the satellite is the electronic computer—and its consequences can be as far-reaching. Computers are remarkable in their ability to receive, record, analyze, present, and, in certain conditions, act with lightning-like swiftness upon tremendous masses of data. They multiply to a remark-

able degree the capacity of the mind to deal with information in endless variation and almost limitless quantity. Just as satellite television is extending sight across the barriers of time and distance, so the computer extends the power of the intellect across barriers no less formidable.

I understand that the computer is even surmounting the ultimate barrier —the male-female relationship. For a nominal fee, I am told the computer will provide a compatible companion for a college date, and if this isn't progress in higher education, I don't know what is.

Computers have become the fastest growing element in our technical arsenal. Only fifteen years ago, there were fewer than one hundred electronic computers in operation throughout the country. Today, some twenty-two thousand computers are in use, and they are increasing at a current rate of five hundred a month.

The computers of tomorrow will respond to handwriting, to images, and to spoken commands. They will commune tirelessly with one another over any distance. They will recognize a voice, a face, or a symbol among tens of thousands. Their vocabulary will extend to thousands of basic words in the language of their country of residence, and machines will automatically translate the speech of one country into the spoken words of another. They will link up globally through communications satellites, high-capacity transistorized cables, microwave conduits, as well as standard telephone and telegraph links. This emerging pattern inevitably will set in motion forces of change within the social order, extending far beyond the present or presently predictable applications of the computer. It will affect man's ways of thinking, his means of education, his relationships to his physical and social environment, and it will alter his ways of living.

The increasingly broad applications of broadcast satellites and computers represent major achievements of the communications revolution. However, other developments now under way will lead to a basic transformation of the entire communications structure. Until recently, our progress in communications was measured in terms of separate and distinctive new services. In the use of the airwaves, wireless telegraphy was first on the scene. Then came radio telephony and radio broadcasting. Next, television was developed and advanced from black-and-white to color. Subsequently, the computer emerged as a communications tool for data processing. These momentous advances occurred separately in time and context. Technology is now imposing unity upon this assortment of random developments.

With the introduction of microwave channels and the appearance of communications satellites and high-capacity cables, there is no longer any distinction among the various forms of communications. All of them —voice or picture, telegraph or data—pass simultaneously through the

same relays in the form of identical electronic pulses. Henceforth—in marked contrast with the past—developments that extend the reach of one will extend the reach of all. The same process of unification will inevitably occur, I believe, in all media of communications. Not only television, telephone, and computer information but books, magazines, and newspapers will be converted into identical bits of energy for transmission over any distance. At the receiving end, these electronic signals will be converted into any form we choose—visual display, recorded sounds, or printed pages.

In the home of the future, today's television console and table model furniture may be displaced by an all-purpose television screen, mounted on the wall. It would be coupled to a sound system and a high-speed electronic printer for recording any information the viewer wishes to retain. This means that the major channel of news, information, and entertainment in the home will be a single integrated system that combines all of the separate electronic instruments and printed means of communications today—television set, radio, newspaper, magazine, and book.

Through a communications center in the home, much of the daily business of the household will be done. For example, by pressing a button, the housewife will be able to look at the merchandise in department stores and other local shops and make her selections. She will push another button, and the computer will place the order and make the necessary deduction from her bank account. She won't even have to write a check. The home will be joined to a new, all-embracing informational medium with a global reach. This medium will serve a vast public of differing nationalities, languages, and customs, and its impact will be profound.

I think there will be a universal language, spoken and understood by all men in addition to their native tongues. It is almost certain that this new language will derive very largely from English. Even today, English is the most widely used of the four thousand or more languages spoken around the world. Some three hundred million people—approximately one out of ten—use it as their primary tongue, and another six hundred million—nearly one in four—speak or understand it in some degree. Both Russian and Chinese present greater difficulties in alphabet, writing, and grammar. Both already pay us the compliment of using English for their broadcasts to Africa and the Far East. It is about the only compliment they do pay. With a single language accessible to all men, new opportunities will be opened to commerce, the sciences, the spoken and written word. A traveler in any part of the world will understand, and be understood by, the people around him.

We can expect to see some form of universal culture take its place alongside the world's national and regional cultures. Already, Americans are acquiring new tastes from abroad, and the rest of the world continues to adopt various features of American life. With the final reduction of

physical barriers to instant sight and sound around the world, and the growth of a universal language, the process will be accelerated.

I am not among those who fear that a universal culture would lead either to drab conformity or to the lowering of cultural levels generally. Those who do, ignore the riches that a global interchange can bring. The Japanese, to cite one example, have brilliantly mastered the art of blending West and East. Their liking for baseball and Beethoven has not diminished their taste for their native sports, drama, and music. Certainly, all of us on this earth have much to give and to receive from one another, and no one need lose his soul or his shirt in the bargain.

We can expect a quickening of world-wide business and economic activities as a by-product of the communications revolution. As illiteracy is reduced, and exposure to new ideas through global media becomes universal, dramatic rises will follow in consumer demand for all goods and services. Common markets will become commonplace. One may even anticipate the day when a single market, encompassing the entire free world, may become possible.

Ultimately, earth itself will become the hub of a communications network extending to the moon, to manned space stations, and to other planets. We shall learn whether life in any form exists on Mars, and we will intensify the systematic search of the heavens to determine whether there is communicating intelligence on any of the countless other planets we can assume to exist in our galaxy. Already, we have built instruments to map the universe which are capable of detecting radio waves from billions and billions of miles out in space. Emissions at certain frequencies in the radio spectrum come to us across the interstellar reaches. We are directing our attention to several emissions in these frequencies that appear to be coming from certain pinpoints in the Milky Way. If and when intelligible signals ever should be received, it will be a most profound moment in human history. We will have discovered a communicating bridge to the cosmos.

Will all the new developments already in process, and ahead of us, alter man's own destiny on this planet? I think not. For example, it is likely that, in time, computers will attain such high levels of development that they will have thought processes comparable to our own, including the ability to learn through experience. These machines may be capable of repairing and even reproducing themselves. When this happens, it has been suggested that man might well leave the world to the mechanisms designed for coping with it. I do not agree with this concept of man's destiny. Man has survived the buffeting of ages and has triumphed over darkness because of a spark given to him by the Almighty—a soul. Man is also endowed with a heart that can feel. These Divine gifts help to form man's character and to guide his brains. No machine can be thus equipped. This is what gives man his uniqueness—courage that breathes defiance when logic counsels despair, a depth of

spirit, the capacity to hope, to laugh, and, if need be, to cry.

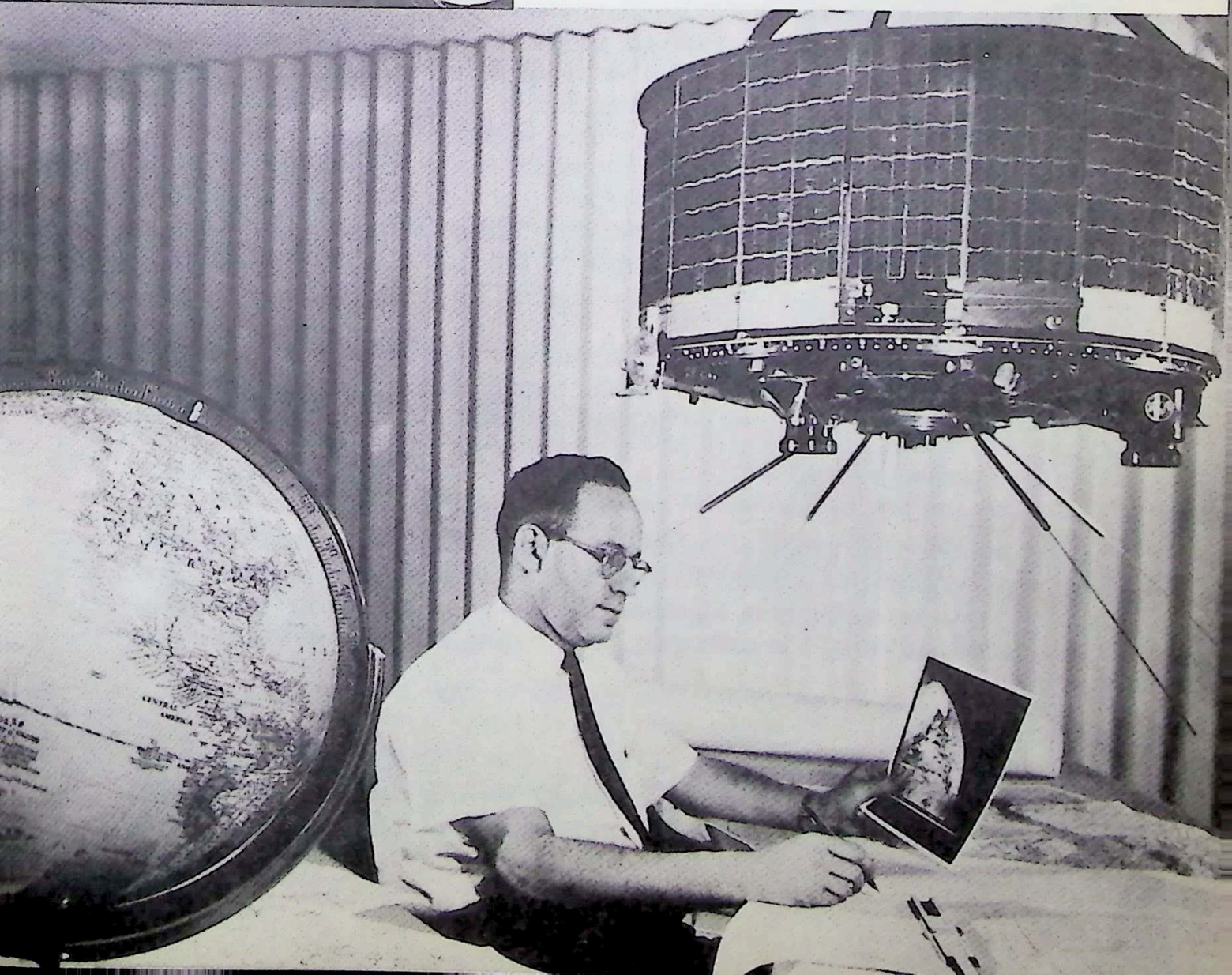
Certainly, had the computer existed at the time, it would have counseled the Greeks to surrender to the Persians at Salamis. But the Greeks defied the overwhelming numerical superiority of their enemy and, thereby, scored a decisive victory. In June, 1940, after weighing all known factors, the computer would doubtless have advised England to seek the best possible terms from Hitler. It would have been tragically wrong, because no computer could ever reckon with, or replace, the indomitable spirit of Winston Churchill. While this spirit exists within man, he need not feel humble before the machine.

I think that we are made greater by the fact that we are members of a vast community of man—sharing the same fundamental hopes and aspirations. Through communications, we finally have a means of entering into a dialogue with the entire human race—singly and collectively —and out of it may yet come bold new concepts of brotherhood. But whether this dialogue is ever successfully completed does not depend alone on what is communicated, or how it is communicated, but in what spirit we seek to establish contact with our fellow man. "It is not brains that matter most," Dostoevski once wrote, "but that which guides them —the character, the heart, generous qualities."

The communicating world, perhaps the communicating cosmos of tomorrow, will need men and women with deep roots in our moral and spiritual heritage to give meaning and bring purpose to all our efforts. It will need those intangible qualities that are transmitted through families, churches, and schools. This ancient world of ours is stirring with change. It will call for all the audacity of our minds and all the learning we have acquired. Above all, it will call for those inner resources of the soul that alone make it possible to advance undaunted into the future.

*Walt Disney, the world-admired genius of motion pictures and an eminent recipient of the Wisdom Award of Honor, is shown here collaborating with the Editors of Wisdom for the special edition of Wisdom Magazine which was devoted to his wisdom and published in tribute to his distinguished achievements as a creator and innovator of cartoons, adventure and nature films, and historical, biographical and educational motion pictures.*

# THE WISDOM OF SARNOFF ON *Inventors And Inventions*



In the span of our lifetime, we have witnessed the advent of great inventions and have seen their inventors pass into history. Never in so short a time have so many great inventors come unknown upon the stage to enact their roles humbly in surroundings of simplicity, then to pass into the Ages. Some received acclaim. But few lived to behold the vast domains which their discoveries opened in industry, commerce, communications, transportation, medicine and education. It is only as we turn a biographical page in history, to read the fascinating story of a life of creative accomplishment, that we realize the majestic opportunities of this century.

In the endless cavalcade of science, we have seen the passing of such men as Edison, Bell, Marconi, Kelvin, Crookes, Roentgen, Thomson, Eastman, Tesla, Hall and the Wright brothers. Their names and their fame live on, because their inventions, though vastly changed from the original conceptions, continue to serve mankind. These pioneers made basic and practical discoveries. They revealed new principles. They laid the foundations upon which were built great industries and services.

Edison's lamp is universal. It lights the world. His motion pictures entertain millions of people and record news and history for posterity. His phonograph, now electronized and combined with radio, plays on. Marconi's wireless encircles the earth. Not only does it carry the dots and dashes which he first sent out on the air waves, but now it transmits the human voice, music and television. Bell's telephone is in millions of homes and through it one may talk across the hemispheres or to ships on the Seven Seas. Tesla's induction motor serves all industry. Eastman's kodak takes pictures for people everywhere. Hall's aluminum is in world-wide use. Crookes' cathode-ray tube is basic to television. Roentgen's X-rays benefit all mankind. Thomson's electron is harnessed as a powerful force. The automobile, developed by the early pioneers, is found on the highways and byways of all nations. These discoveries and many others serve as instruments of progress in the hands of new inventors.

Science is no longer the exclusive province of lone scholars or inventors. Science, while changing the world, has changed itself. It has accumulated knowledge so vast as to be beyond assimilation by a single human mind.

Where one scientist toiled alone fifty years ago, hundreds work together today in cooperative effort. Research institutions of education and industry have brought them together and provided them with matchless facilities for exploring the unknown, for creating the new and improving the old.

Upon the foundations created by the pioneers of science, now stand splendidly equipped research laboratories. Within them are assembled men of ideas who use the tools of science to broaden and extend the trails

blazed by pioneers, and to open new horizons. These laboratories hold the promise of the future. They are the bulwarks of our national security, for war has taught us that science is a nation's greatest fortification, as well as the fountainhead of its progress and its search for enduring peace.

For fifty years, the basic inventions related to electricity and electronics have been passing through a process of evolution. At the moment, we are busy with basic improvements and new applications, while science seemingly tries to catch up with itself. But fundamental research, proceeding in the laboratories of our universities and industries, will produce fundamental changes.

The radio field provides a good illustration of the process of evolution. We still use electromagnetic waves, but they are not produced by the spark gap that Marconi knew, nor are the waves detected by the coherer. The invisible waves are generated and detected by electron tubes. Marconi had no such device in 1896, nor even in 1901 when he flashed the first wireless signal across the Atlantic. Since that day, thousands of inventors have contributed to the advance of radio. They created radar and television. They made it possible to send speech and music to every town and hamlet on the face of the earth. They learned to generate heat by radio. They developed the electron microscope which enables us to see and photograph viruses and particles hitherto invisible.

Ultrafax, a combination of television, radio relay and photography represents a great advance in communications. Ultrafax can handle documents, letters, printed pages and messages at the rate of a million words a minute. At this speed, a 500-page book could be flashed from New York to San Francisco in half a minute. When fully developed this new method will be able to transmit coast-to-coast in a day the equivalen of forty tons of airmail. This may lead to a radio mail system.

Significant developments in the field of communication are evolutionary. They are the result of mass attack by science on a wide front over trails blazed by the pioneers who charted the first pathways into the unknown. Years of effort, by thousands of research men and engineers, have been necessary to find new knowledge, and to put it all together in a vastly improved system of communication. Nevertheless, we are only on the threshold of radio and television; for its possibilities are endless. Its frontiers are in the outer reaches of space, and its sphere of operations is the universe.

The years have a way of fitting inventions into our life so that they become accepted as matter of fact. We regard their social and economic impact, their performances and services, as merely commonplace. In a way, this is unfortunate, for we should not, either as a nation or as individuals, treat them in such a casual manner. Our opportunities to

succeed as individuals and to advance as a nation were often found in tiny clues, hidden amid simple surroundings. The steam engine was born in a tea kettle. The airplane came out of a bicycle shop. The automobile first sputtered and moved in a small carriage factory. Broadcasting started from an amateur station in a private garage.

Each new invention was, at the outset, confronted by skepticism. The public was indifferent and a long period of time elapsed between their introduction and their popular acceptance. This span has been shortened greatly by the new implements of science and the modern means of exploitation. But the former indifference must not be replaced by another apathy—a lack of concern by the public as to the use made of new inventions and discoveries. There is danger in either attitude and more so today than ever. Failure to appreciate the significance of inventions may retard our technical progress and threaten our national security. And failure to guard against the evil use of technological developments may destroy our capacity for social progress. We need an informed and alert public opinion to stand guard against both dangers.

Mankind has reached the point where it cannot afford the costly consequences of skepticism and indifference. In the midst of our accelerating cycle of technical improvement, science has produced another fundamental discovery—nuclear fission. With the Atomic Age, which it has ushered in, changes are destined to come that will make the revolutions caused by steam, by electricity, and by electrons seem simple by comparison. But just as the opportunity for constructive achievement is present, so is the peril that this new discovery may be turned to evil purpose.

The big black headlines, which introduced the world at large to atomic energy, remain vivid in our memories. While war raged, this new force came upon the world packed in a bomb that blasted and shattered two cities. Atomic energy at the outset was linked with death and destruction. Its potentialities for good were overshadowed by the terror that it struck.

Thousands of scientists have devoted their talents to harnessing atomic energy for the peaceful purposes of health, agriculture, transportation and industry. All of us wish to see these purposes fulfilled. But more than wishing is required. Laymen, too, must keep themselves informed on this important subject and reflect their interest in a manner that compels attention. Knowledge will increase the power of the public to speed progress on the political and social level as well as in the laboratory.

I have often wondered how the course of history might have been changed and progress impeded, had electricity been dropped upon the world in a terrifying and destructive bomb, as was atomic energy. Then, too, the peaceful and industrial uses of electricity would have been obscured for

many years in the smoke of fear and terror. Its utility in communication, commerce and health might have been pushed aside while scientists concentrated on its development as a weapon of destruction.

We know that electricity can be savage if man so chooses. But we have learned how to control its power and how to use it constructively. The potentialities for scientific development and beneficent use of atomic energy, likewise are unlimited.

So clear are our opportunities in this Atomic Age—if we intelligently accept the challenge—that they promise to dwarf the wonders we have witnessed in the past fifty years. Yes, in the past five centuries! Inescapably, the future of the world and of civilization is linked with atomic energy. When science releases that power, and society learns how to control it properly, it will start a universal chain reaction that is bound to affect significantly the political, social and economic life of people everywhere.

Beyond today's horizon, in addition to atomic powered submarines, we will see automobiles, tractors, airplanes, locomotives and ships powered by small capsules of nuclear energy. We shall have atomic propulsion. It is possible that a mere speck of radioactive material will serve as the power for radio and television receiving sets, and broadcasting stations also will take their power from this new form of energy. Such a miniature power supply in capsule form may make possible radio receivers no larger than a wrist watch, and tiny television sets to be carried in the pocket like a camera. When this day comes, people also may carry pocket-size radiophones that will enable them to communicate wit home or office, no matter where they are.

Atomic energy is not merely a new laboratory domain of the scientist. It will spread into many phases of our life—into the human body and the home, as well as into industry. Therefore, every citizen should be interested in it. Every student should learn all he can about this great new force, and educators should impart to the public mind the importance of the atom and its possibilities. An informed and active public opinion by freedom-loving people can help to direct the new forces of science towards peace and prosperity.

Science is at new crossroads. We, the people, stand there, too. Humanity and the destiny of future generations depend on the turn we take at this crucial fork in the road of Time.

Admittedly the advent of printing made possible the spread of a great deal of mediocre, trashy and detrimental writings. But it also made possible the vast dissemination of the Bible, the thoughts of great seers and philosophers, the accumulated literary treasures of our civilization.

On balance, few will doubt that man has been enriched and ennobled by Herr Gutenberg's invention. And the same holds true for Marconi's invention.

The most significant fact about my sixty years is that they have coincided with the tumultuous emergence and growth of the electronics industry. I also had the good fortune in my early years to be a contemporary of men with vast inventive talent—men like Guglielmo Marconi, Lee De Forest, Reginald Fessenden, Howard Armstrong, Ernst Alexanderson, John Carson and Vladimir Zworykin. Looking back across the decades, I realize a fact that impressed me little at the time —how young they all were. Even Marconi, when I met him for the first time in 1906, was only thirty-two. But few even among these giants of invention could foresee the full dimensions of the future that their genius helped to shape.

Through electronics we have telescoped space and time and conquered isolation. We have probed the heavens and oceans, connected the continents, manipulated instruments across millions of miles of space, informed and entertained mankind and stored for instant use vast accumulations of human knowledge. We have become a new band of explorers impelled by what Albert Einstein called a holy curiosity. We have shared the same great moments of anticipation and eagerness that men of an earlier age experienced when they sailed with Columbus or Magellan or Drake. And this adventure, far from diminishing with time, has taken on new dimensions. Every discovery and invention has been simply a prelude to new challenges and fresh opportunities.

There is no reason to doubt that the continuing progress of science and technology can provide solutions to most of the material problems that face the world. Our chief concern must be with the spiritual, social and political progress of mankind. In the final analysis, it is the use to which the new invention is put, and not the invention itself, that determines its value to society.

Pioneers blaze new trails. As students of history, geography, and science we have learned that men and women imbued with new ideas, courage and determination are those who reach new goals and achieve success. The old familiar trails teach us much, but eventually they must be abandoned for the new. Progress is not made by following a narrow, beaten path. If it were, Columbus might never have discovered America; Edison might never have invented the electric light; Weizmann might not have developed his celebrated process of firmentation; Morse, Bell, Marconi and other great inventors would never have contributed so much to the advancement of the world.

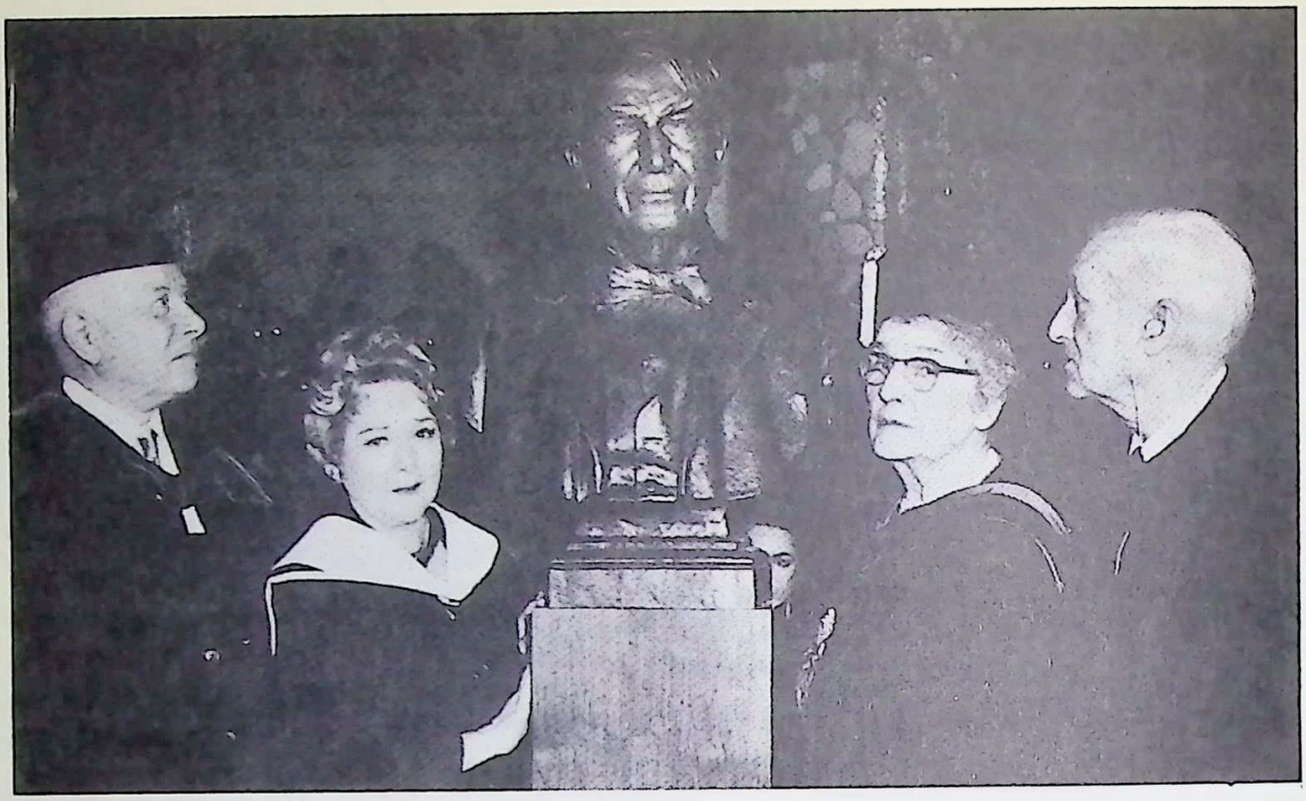
It has always been true that the things men live with largely determine the ideas men live by. When the Western world learned how to use gun-

powder, it meant the beginning of the end of knighthood and the feudal system. When Eli Whitney invented the cotton gin, it was the beginning of the end of slavery. When the tractor and the harvester and the reaper were developed, we began to see a trend away from the small family farm. The automobile changed the pattern of rural life. Radio, television and electronics already have changed many of our ways of daily life, and along with continued research bid fair to change our pattern of living. Color television has added new dimensions to communications and to the entertainment arts. It supplies a new power to advertising and greatly increases its merchandising possibilities. Color adds realism to journalism, intensifies television as a social and educational force and opens the way for significant advances in service to the public. It also opens doors to new opportunities for interesting jobs.

I have never known any invention that benefited mankind that did not, in some way, benefit industry.

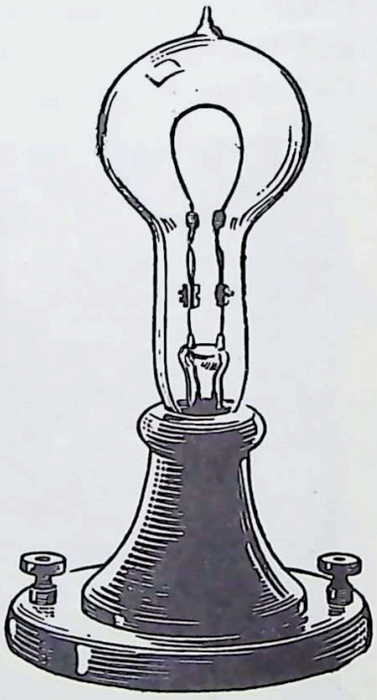
The vast universe is still unexplored. To advance civilization we must continue to go up—and so we will—as man becomes master of nature. The time may come when man no longer will have to dig in the earth for the basic necessities of life. He may also procure them from the air. Civilization today cries for new Edisons and Marconis, for young men and women to explore the uncharted wilderness of the ionosphere with its cosmic rays and its mysteries as myriad as the stars.

*One of man's greatest discoveries was made by Johann Gutenberg (1400-1468), the German inventor of printing from movable type. Gutenberg began experiments in printing in 1439, and brought out the first printed Bible in 1456. Known as the Gutenberg Bible, with the text printed in Latin, it was his first completed work and his masterpiece. The inventor himself was never able to prosper materially from his invention. This famous volume forms a bridge between the manuscript and the printed book.*



*When a bronze bust of Thomas Alva Edison was installed in the Hall of Fame for Great Americans at New York University, David Sarnoff (left) was honored and delivered the principal address. Shown also, above, are Mary Pickford, a trustee of the Edison Foundation, Mrs. Madeline Edison Sloane (right) and Charles Edison, the inventor's children, who unveiled the bust.*

# THE WISDOM OF SARNOFF ON *Edison*



*Thomas Edison (left) faced an NBC microphone in 1928 in the network studio, where he spoke briefly to the American people. In 1879, Edison invented the first commercially successful electric light (above).*

As a boy in the little town of Milan, Edison must have been imbued with the spirit of the pioneer which Ohio engendered as trails were blazed westward. Imagination, dynamically related to a persistent soul, never discouraged by defeat, comprised the sinew of his fame. Every disappointment, every failure of an experiment was a new challenge to his curiosity—a new spur to his determination to succeed. He triumphed through creative thought and left the world a rich inheritance of knowledge. His tireless efforts and his creative genius now shine out across the earth. It was electricity, harnessed by this native son of Ohio, that made this state a shrine of science through the electrification of communications, agriculture and industry. Edison created new industries and new employment for millions of people. He lighted and enlightened the world.

It is an interesting fact that Edison's electric lamp is closely related to later developments in electronics. And the modern structure of radio and television is built upon the foundations which Edison helped to erect. His discovery in 1875 of mysterious sparks that diffused or spread in all directions, he called "etheric force." His discovery in 1883 of elusive electrons at play within the incandescent lamp led to the development of the electronic tube detectors, amplifiers, and oscillators. History records that phenomenon as the "Edison Effect."

It was the "Edison Effect" that inspired the British physicist, John Ambrose Fleming, to develop the first electron tube detector or radio signals—a two element tube which he called a "valve." Fleming's valve in turn provided the steppingstone to Dr. Lee De Forest's epoch-making invention of the three element tube which he called an "audion." De Forest's audion not only detected but amplified radio signals, and it also functioned as an oscillator. The revolution in communications which has so greatly influenced the world we live in, may fairly be said to derive in part from the incandescent genius of Thomas Alva Edison.

We rightly think of Edison first as the lamplighter who dispersed darkness—an achievement in itself sufficient to make him immortal. But he was far more than that. Edison's influence—the "Edison Effects"—are all-pervasive. They can be traced in telegraphy and telephony, in the phonograph and the cinema, in radio and television, indeed, in every major step of our technological advance.

Edison's storage battery, his dynamos, motors, microphones and the phonograph all became vital parts of radio. Now the motion picture, which he made an accomplished fact in 1889, is finding a new and widespread medium of expression in television.

So close was Edison to the invention of wireless, that in 1885 he took out a patent on "telegraphy without wires." He called his system "grasshopper telegraph," but he said he was "too busy with other things" to devote more time to complete the invention of wireless. It remained for a young

man in Italy to do that. When Marconi received the first transatlantic signal in 1901, Edison remarked that he would like to meet "the young man who had the monumental audacity to attempt and succeed in jumping an electric wave across the Atlantic."

So staggering is the list of Edison's inventions, and so practical is their usefulness, that he is recorded in history not only as the "lamplighter," but as "the supreme inventive genius of the industrial age." The applications of his inventions to peacetime pursuits reveal the tremendous potentialities of science for the benefit of mankind.

Those who have followed Edison in science have traveled close to trails which he blazed. They succeeded in meeting the demands of global war and, as a result, science emerged from World War II as a powerful force that created new instrumentalities and promised many others for use in peacetime, if man would only direct his thoughts to peace instead of war, and his scientific research to higher elevations. Spiritually, mankind has always looked upward for guidance and eternal truths. It is not strange therefore that the physical sciences should strive also to explore the higher altitudes in the search for scientific truths.

Edison's life was a drama of the lone inventor, toiling alone, often in meager circumstances. Today, science has the benefits of organized, industrial research affording inventors every facility, cooperation and comfort, for work and for study. Without it, World War II might have been lost. Industrial research conducted by private enterprise is a bulwark of the United States. It promotes victory in war and assures progress in peace. It is a safeguard of civilization.

One of Edison's primary contributions, perhaps the most important of all, is rarely included in the amazing inventory of his triumphs. I refer to the laboratory of industrial research, which was to become an essential and fruitful element in American scientific progress.

At Menlo Park, over ninety years ago, Edison established the world's first industrial research laboratory. He assembled a front-rank technical staff whom he used to refer to as his "one hundred earnest men," and whom others nicknamed "the insomnia squad." For his team he set a characteristically demanding goal—"Invent some minor thing every ten days, and some big thing every six months." This was the first attempt to conduct research on an organized basis. Today, the results of that imaginative enterprise are imperishably evident. Massive research laboratories have become the very bone and sinew of scientific-technological progress.

It may be said that Edison invented a new technique for inventing. Without denying free play for intuition and inspiration, he made inven-

tiveness a purposeful and organized enterprise—in which the minds and energies of hundreds and even thousands of men are focused upon the solution of specific problems.

Edison provided us with a wonderworking method for the attainment of material progress. It is the method that continues to wrest secrets from physics, chemistry and metallurgy, from aerodynamics and electronics, and from nature itself.

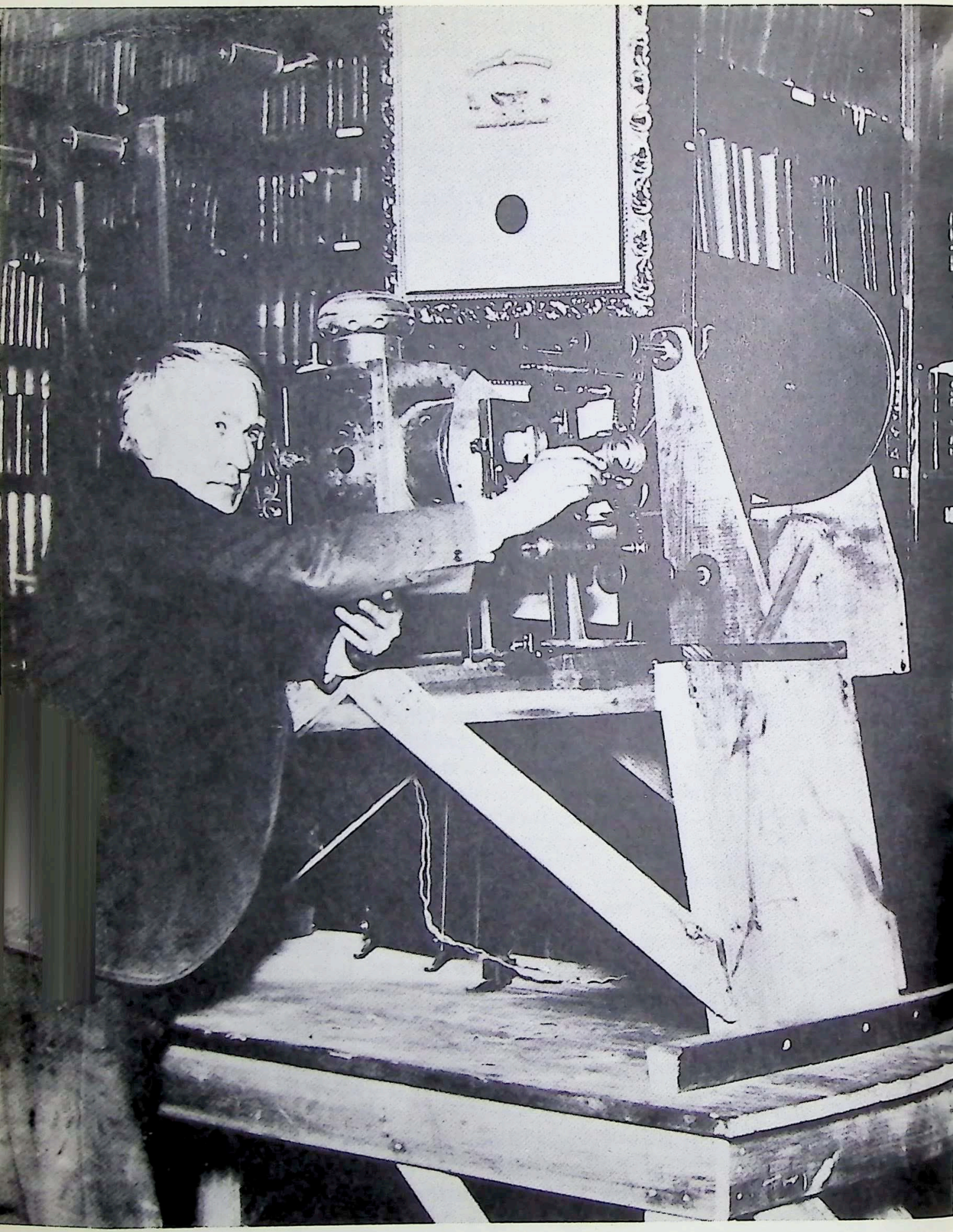
Not far from Edison's workshops in New Jersey, now stands the Princeton laboratory which is the Research Center of the Radio Corporation of America. I am highly honored that it bears my name. Like all great research efforts, it concentrates the diverse talents and specialized skills of a large number of trained scientists, physicists and engineers. The principle of collective research upon which it operates—the technique of setting a fixed goal that may seem impossible until it is reached—is a product of Edison's extraordinary mind. So we can say that he has a rightful share of credit for multitudes of products that have materialized since the day when the electric lamp became a practical fact.

The electric light will remain forever the luminous symbol of Edison. Throughout the world it shines in his honor every moment of the day and the night. In every window, on every street, on every lighted ship or plane, we behold the imperishable glory of Edison. And there seems to me a peculiar fitness in that symbol. For through the ages light has awed and fascinated and inspired mortal man. Our thinking and feeling, our very vocabulary, have been drenched in a wondering awareness of light. Even in television we behold a new extension of light, for television is light deployed as pictures on a screen. The many millions of television sets in American homes produce no small amount of light, not only in the material sense but, I venture to hope, in the intellectual and spiritual senses of the word.

We speak of our great prophets and teachers as bringers of light and can conceive no worse fate than to be cast into utter darkness. John Milton proclaimed that "God is Light," and hailed it as the "offspring of heaven first-born." The Psalmist prayed for "A Lamp unto my feet, and a light unto my path," as we all do when we repeat the beautiful line of Cardinal Newman: "Lead, kindly light, amid the encircling gloom."

Tradition has it that the last words uttered by the great German poet, Goethe, were, "Light, more light!" And light, more light is what Edison bequeathed to mankind. It is an overwhelming thought that he made the monumental gift only eighty-eight years ago—the span of a single lifetime.

Edison is uniquely of our America and of our times. He was an individ-



"If I have spurred men to greater effort, and if my work has widened the horizon of man's understanding even a little and given a measure of happiness in the world, I am content."
—THOMAS ALVA EDISON

In the year 1887, the idea occurred to me that it was possible to devise an instrument which should do for the eye what the phonograph does for the ear, and that by a combinatio[illegible] all motion and sound could be recorded and repro[illegible]aneously. This idea, the germ of which came from th[illegible] called the Zoetrope, and the work of Muybridge, [illegible] has now been accomplished, so that every cha[illegible]ion can be recorded and reproduced life si[illegible]

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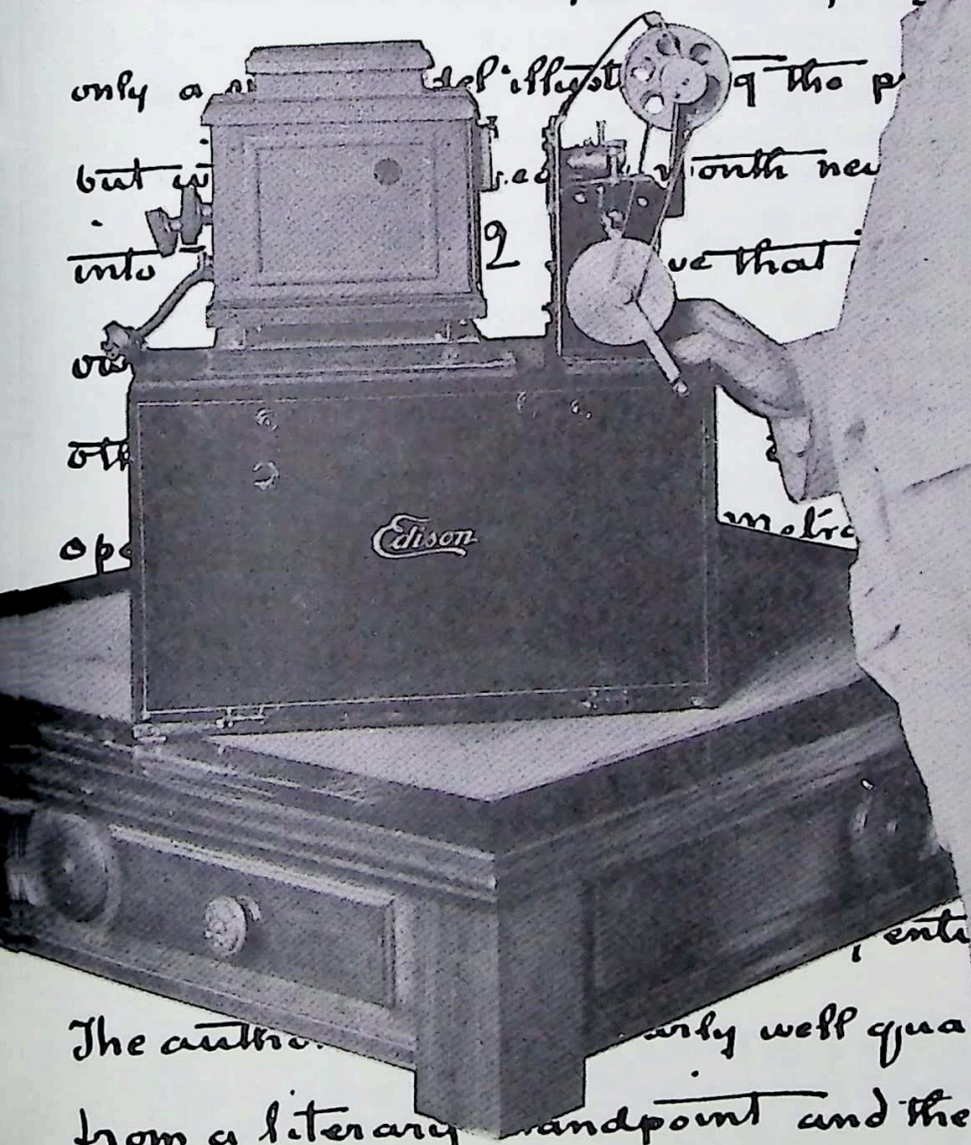

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Thomas A Edison

ualist through and through, ceaselessly breaking new ground. A pioneer pushing dauntlessly across new frontiers, exploring unknown continents of matter and energy.

Often, creative periods in history have produced one man who, in his life and labors and character, summed up the dominant impulses and purposes of his time. Leonardo da Vinci was such a man, and he became the immortal symbol of the Italian Renaissance in the fifteenth and sixteenth centuries. In his conceptions and achievements we see, as in an enlarging mirror, the special qualities and ideals of his age.

Thomas Edison is the immortal symbol of our Technological Age in the nineteenth and twentieth centuries. He possessed in extravagant measure those talents, virtues, insights and character traits, most cherished in our land and most pertinent to its destiny.

Edison was the poet of technology, seeking out hidden rhythms in nature, combining them in symphonies of invention. It is surely not accidental that his bursting creativity, like that of da Vinci, overflowed in copious notebooks—2500 of them—where he jotted down observations, rough sketches and casual thoughts.

The night never darkens on the empire of Edison's genius. More than any other man, it was he who harnessed electricity, the driving force of this industrial epoch. What could better suggest the catholicity of his role than the common light bulb? In remote lands, as much as in modern cities, it is the light bulb of Edison that has banished the night, that has added years to the productive and social lives of nearly every human being.

No inventory of Edison's inventions can compass the true dimensions of his achievements. Every one of them, even his tentative and uncompleted explorations, became the wellspring of inventions by others. Today, his contributions flow as perpetual tributaries into the main stream of every industry, every science, every technology. Subtract what is Edison's in our current civilization, and the calendar of history would roll backward by decades.

Even industries which matured after Edison's lifetime have drawn their sustenance from his genius. One does not usually hear of him as a pioneer of radio, television, automation, atomics and the broad field of electronics. Yet his creative imprint is indelible on each and all of them.

Edison's dynamos and batteries have provided the electric power on which television and radio depend. The principles of his carbon transmitter are built into every microphone. In 1889, he established an early alliance with television by demonstrating his invention of the "Kine-

toscopic" camera—an outgrowth of his search for a means of reproducing motion and sound simultaneously.

Edison's work in sound recording and reproduction remains at the foundation of all broadcasting. The golden tones of Caruso and the musical virtuosity of Toscanini flow with fidelity through the homes of America today, and for all generations hence, because of his basic concept of the phonograph.

The words which I saw on Edison's wall many years ago—"There's a way to do it better—find it."—remain imprinted in my mind because they are so relevant to what I regard as his most vital and enduring contribution. His greatest invention, the one most productive and most instructive for our times, was not a single piece of equipment but a unique method of innovation. For it was Edison who first conceived the idea of assigning teams of gifted workers to find "a way to do it better." In systematizing the quest for new knowledge, he became the father of modern research.

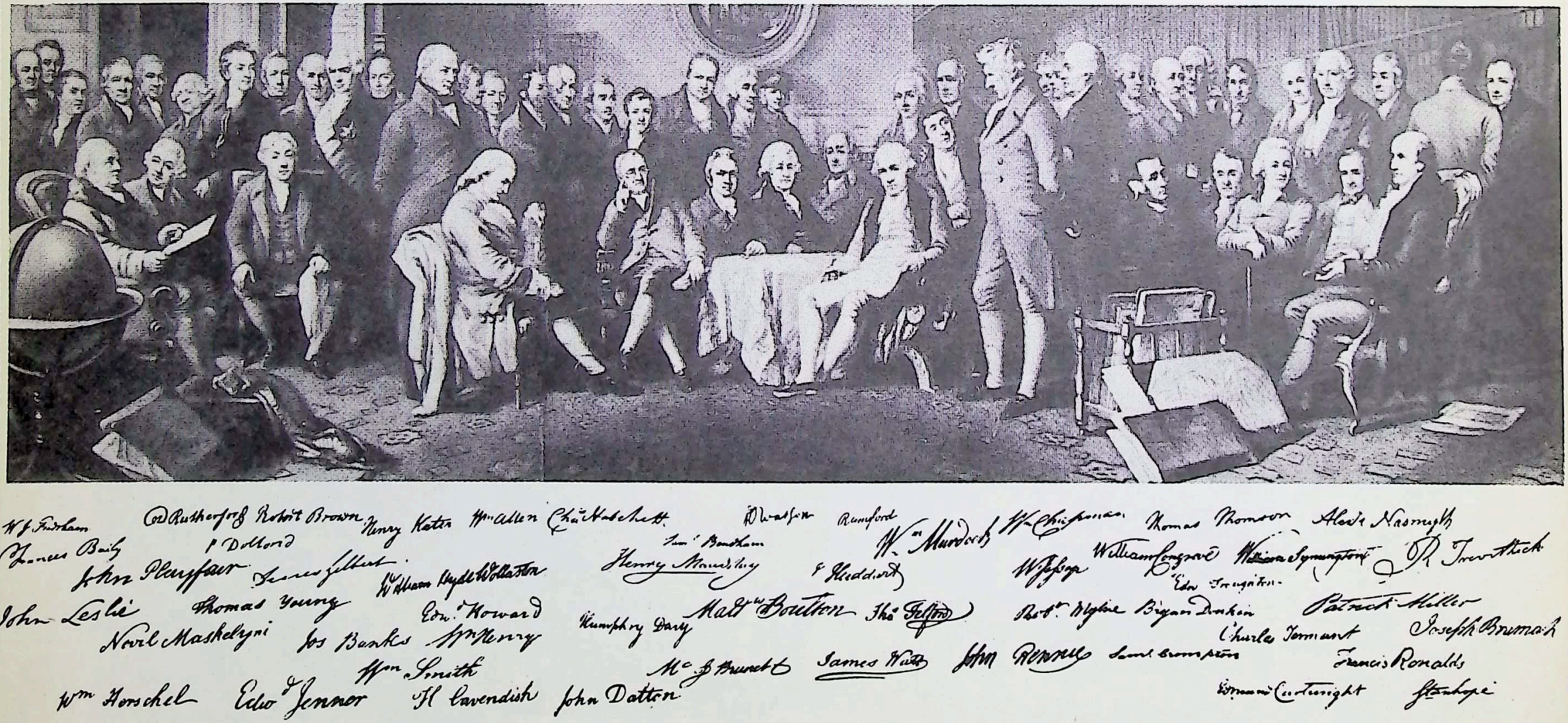
In our country, some 3000 companies maintain their own research facilities, employing over 300,000 scientists, engineers and supporting personnel. A vast number of universities and government agencies are engaged in systematic research. From the neglected stepchild of industry, research has flourished until it is an industry itself—indeed, our fastest growing industry. This year, in the United States alone, many billions will be spent on research and development—more than our entire national income at the time Edison conceived the procedure.

I believe that the next ten years will see more material progress than the last fifty years. Computers, operating a thousand times faster than present models, will take over more and more office and factory chores. Global television in full color, relayed by orbiting satellites, will spread knowledge as Edison's bulb has spread light. Thermo-electric systems, without any moving parts, will heat and cool the home with unexampled efficiency. Electronic tools for medicine will touch off an avalanche of improvements in preventive therapy, diagnosis and treatment.

Vast developments are now fermenting in hundreds of big and little laboratories—developments that will dwarf those of the past. Even so, they should never obscure the crucial fact that Edison's team concept would have been meaningless without Edison. The surpassing importance of the individual cannot be omitted from the equation of achievement.

Our ability to mesh the skills of thousands has produced astounding breakthroughs in every area of endeavor. Yet those who live in the fellowship of science know that behind every imposing research institution there is an individual scientist of unusual ability.

*(Above). Great American Scientists and Inventors. This rare painting shows Goodyear seated at left of table, Morse at right, facing Hoe, and leaning above Goodyear is Cooper. Leaning against the left of the pillar is Henry, at right is Ericsson. Standing left of Goodyear is McCormick. Behind McCormick is Colt. Seated at far right is Howe. On the wall is a painting of Franklin.*

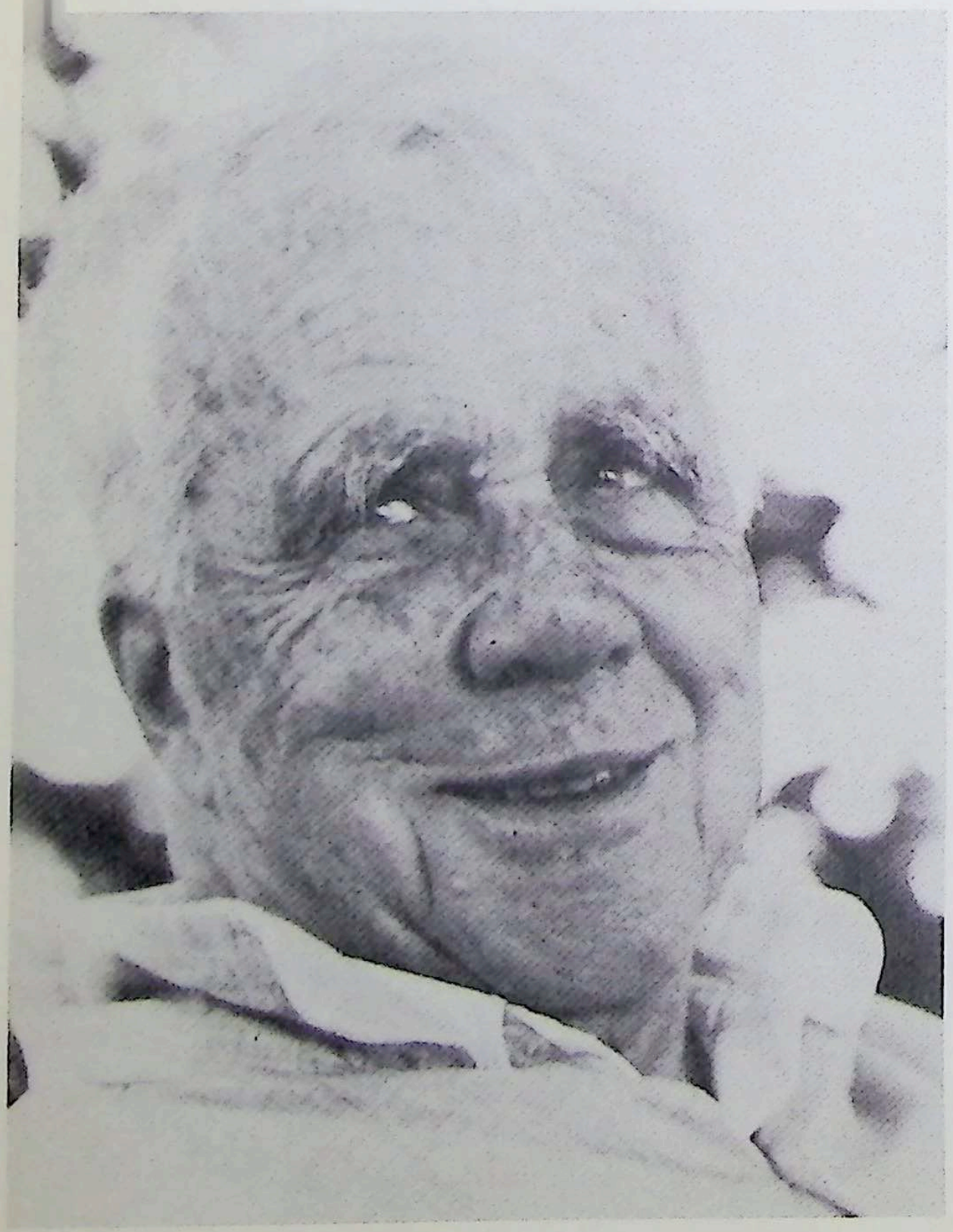


*Great British Scientists and Inventors. The signatures include those of Jenner, Cavendish, Davy, Dalton, Rumford, Watt, Stanhope, Miller, Trevithick, Smith, Young, Rutherford, Brown, Herschel and Leslie.*

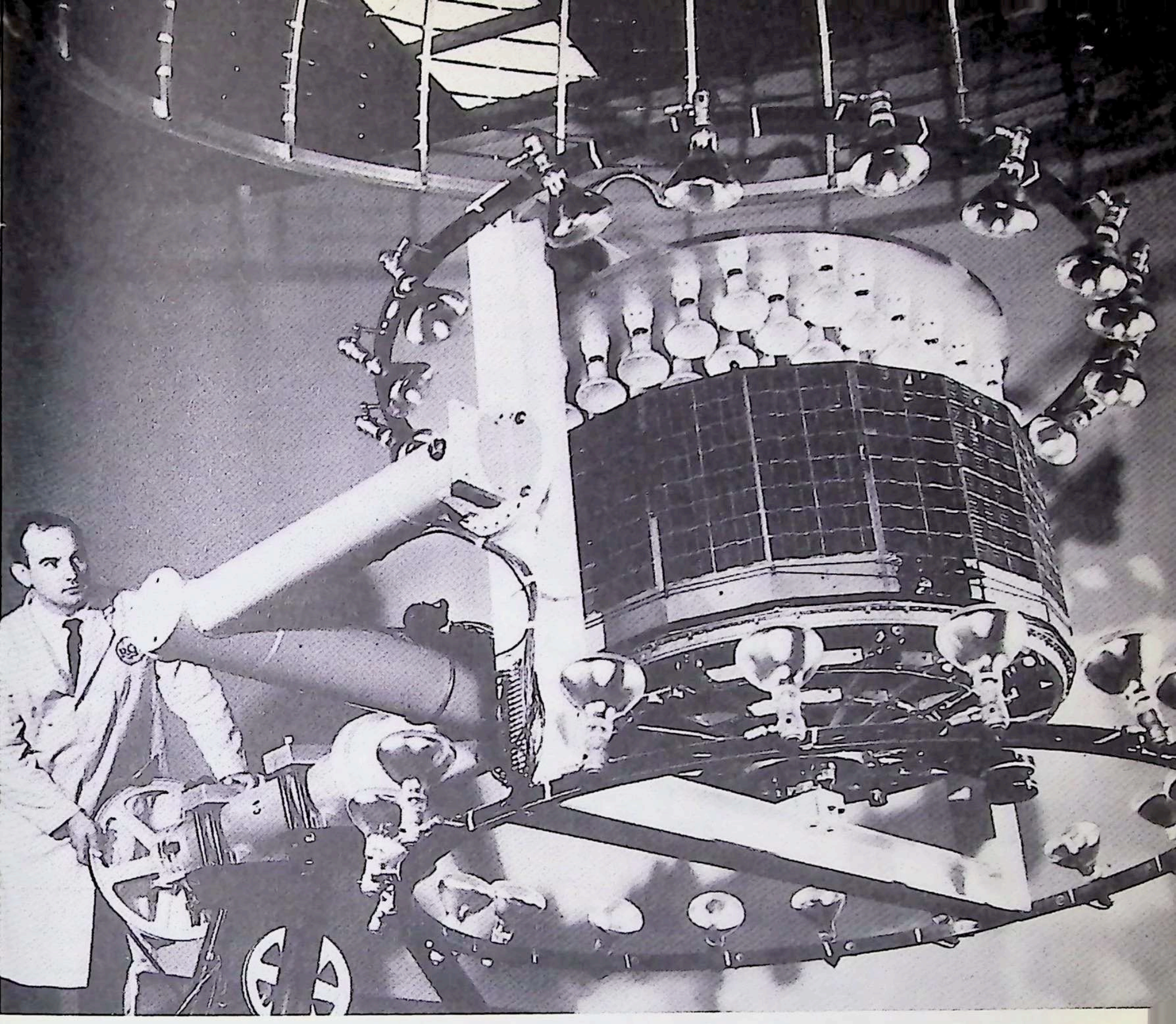
The brilliant career of David Sarnoff demonstrates that he has reached his present proud position because he has had a purpose in life. He has believed with Robert Louis Stevenson that "we are put here to do what service we can, for honor and not for hire," and he has devoted himself to the task. Existence to him has not been a business to be transacted in an indifferent manner, but it has meant a great opportunity as well as a serious responsibility. For many years he has worked earnestly, patiently, incessantly and successfully to extend our knowledge of science, and to apply it in the service of man. His faith in the divine is reflected in his reverence for and his belief in the sacredness of humanity. His greatness lies in the nobility of his aim, in the energy and wisdom with which he is carrying it out during his lifetime. What will his future years contain? No one can tell. But of this we can be sure, they will be spent in the highest and best kind of service for God and for mankind.

Robert Frost

ROBERT FROST
*Poet, Author and Educator*



*Robert Frost, four time winner of the Pulitzer Prize for Poetry and former Professor of Poetry at Harvard, as he appeared on the NBC-Television Wisdom Series in a discussion of his life and work. A lifelong critic of regimentation in schools, colleges and universities, Frost recalled his wide range of personal experiences during the television conversation—as a mill worker, country schoolteacher, cobbler, small-town editor, and farmer—that furnished the background for his accomplishments in poetry. An eminent recipient of the Wisdom Award of Honor, he collaborated with the Editors of Wisdom to create a special edition of Wisdom Magazine which was devoted to his wisdom and published in tribute to his achievements in literature and education.*



# THE WISDOM OF SARNOFF ON *Electronics*

Never before in history have two such prodigious forces as atomics and electronics unfolded simultaneously. It is a portent of amazing changes ahead that will overshadow even the dramatic advances of the last fifty years. The new types of energy released by the atom and controlled by the electron have already altered the character of everyday life, and they give promise of revolutionizing our lives even more drastically in the decades to come.

Geologists tell us that the universe is some six billion years old. Yet the atom was discovered only about one hundred and sixty years ago and the electron approximately seventy years ago. The combination of the atom and the electron—that is, the release of the energy within the nucleus of the atom and the control of that energy by the electron—is actually new because the first demonstration of its enormous power was when the first atomic bomb was dropped on Hiroshima.

The atom and the electron are the building blocks of the universe. Whenever the world was created, the atom and the electron were created simultaneously. They are the particles of nature that hold the universe together. And they were not invented by man. They were only discovered by man. We do not know how many more particles of nature, possessing these great potentialities—both for good and for evil—are yet to be discovered.

When the atom is split and the energy within its nucleus is released, we find within that nucleus not only electrons, but protons, mesons, neutrons and heaven knows how many other particles of nature yet to be discovered. So, when we speak of opportunity for the future, we should bear in mind that we are living in a new world that is just beginning, with forces of such dynamic potentiality that they promise to supply all of our basic needs—food, clothing, shelter, and, of course, power.

Electronics has changed the face of the nation and the world it serves. It is not an exaggeration to say that without electronics our mode of living would be far different than it is today. In communications, manufacturing, commerce, diplomacy, military security, entertainment and other areas of our work and play, electronics has contributed to comfort, to security and to efficiency. It would be difficult, in fact, to isolate any human activity today that has not felt the impact of the electron. The uses to which it has been put are so vast and varied that over the past decade electronics has grown at a rate three times faster than the national economy.

To keep pace with the rapid march of science, we must accelerate our steps socially. To do so intelligently and effectively, we need the Light that illuminates our mind and the Power that ignites the Divine spirit within us. The secret of Progress is in man himself. This we need to think about, in humility.

Though natural and man-made light is an element as indivisible from the processes of life as air and water, it is still endlessly mysterious and a continuing challenge to science and man's ingenuity.

We know that light, traveling at a speed of 186,000 miles a second, is the fastest moving form of energy. Man has crashed through the barrier of the speed of sound but, though his pretensions are infinite, he cannot even imagine a break through the speed limits of light.

We have a fundamental building block of the universe, and one with which men of science have been playing in their laboratories in the last few generations. New patterns of illumination are emerging even now. It was the intensive search for high-efficiency fluorescent materials for the television screen that led to the development of the fluorescent tube as a rival to incandescent light. And today, curiously, it is once more television research that bids fair to produce another and even more far-reaching revolution in lighting.

We are now engaged in the development of a new form of light—electronic light. This new form seems destined to carry forward the great work sparked by Edison and is likely to loom ever larger in public consciousness as this development progresses.

When Faraday first produced an electric current, neither he nor his generation could visualize the spectacular future he had unlocked. Neither did Marconi dream of broadcasting and television when he succeeded in sending the first faint wireless telegraph signal through the air. I am convinced that electronic amplification and conversion of light will enrich life for all of us.

The fact that electronics and atomics are unfolding simultaneously is a portent of incalculable changes ahead. Never before have two such mighty forces been unleashed at the same time. Together, electronics and atomics are destined to dwarf even the industrial revolutions brought by steam and electricity.

Doubtless some of the innovations in electronics will call for a change in products or methods of operation in some of today's business organizations. However, the whole history of our American economy proves that such changes spell progress. From the viewpoint of the country as a whole, we may be sure that it will mean many new jobs for every job canceled out. The contrast between the millions employed by the automotive and related industries and the employment provided by the blacksmith shops they displaced, is an overworked example. But it tells the basic story.

We can count on the leaders of American business to keep pace with the

great surge of change. Rather than attempt to turn back the clock of science, they will make the most of the new day and its new hours. Their technical and commercial abilities, honed on the whetstone of experience, will be channeled in the new directions.

Progress in the deeper and truer sense cannot be measured by the yardsticks we use for electronics or nuclear energy. Its standards of measurement are spiritual, in units as tenuous as beauty and virtue, happiness and fulfillment—above all, peace and peace of mind.

It is good for our inflated pride to recall that the things we cherish most —our great moral and religious systems, our treasures of learning and art and philosophy, our heritage of what is closest to the Divine in the mortal—have come down to us from ages when there was no electric power, no automobiles, no radio and no television. The Magna Charta and the Declaration of Independence, let us never forget, were written by torch, kerosene or candlelight.

Whether the splitting of the atom can be called "progress" will depend, in the final analysis, on whether we can find the wisdom to direct the released power into channels of peaceable and constructive use. We can all ardently join General Dwight Eisenhower in the hope he expressed recently that "the miraculous inventiveness of man shall not be dedicated to his death but to his life." That and that alone is the test.

There is no excuse for despair. We know that electricity, too, can be savage if man so chooses. But we have learned to control its power and to use it beneficently. Man can do the same with nuclear power. The Adam can triumph over the Atom. Its potentials for the services of peace, for increasing prosperity and eliminating poverty, for health and happiness rather than for mass terror and destruction, are unlimited.

We sit at the focal center of forces which are reshaping civilization. The next five years will bring more dramatic technological progress than any comparable period we have known. The opportunities facing our youth are, if anything, more challenging and promising than those that we of the pioneering generations enjoyed. This is what keeps us all moving steadfastly in the electron's orbit. Because it is so dynamic, so alive with change and promise, electronics has from the beginning attracted men of exceptional creativity and daring, impatient of the static and routine. Together they have built this great industry, under the creative spur and challenge of competition.

The first manifestations of electricity were observed by ancient philosophers and scientists. They derived the name electricity from the Greek word, elektron, for sun-god, because they noticed that amber, which acquires an electrical charge by friction, had a sunny luster. Thus we

may trace the genesis of electrical science back to 640 B.C., when Thales of Miletus first observed the phenomena of frictional electricity and magnetism. Slowly but steadily the powers of these new found forces began to reveal themselves as man continued to make discoveries and to invent.

Discovery of the relationship between electricity and magnetism, by the Danish physicist Christian Oersted in 1819, liberated a mighty force upon the world. As Oersted so poetically observed, it taught man that "the universe is a manifestation of an Infinite Reason, and the laws of Nature are the thoughts of God." Magnetism led to the harnessing of electrical energy. Magnetic induction led to the electric motor and the dynamo, to the telegraph and telephone, and to the invention of thousands of machines which have created the scientific and industrial age that we know today.

It was not until 1896 that the tiny electron itself was discovered by Thomson in England. And that was just at the time when Marconi was first revealing wireless telegraphy to a world that found the miracle of invisible electromagnetic waves traveling through space difficult to believe. But in our time we have seen convincing proof of this miracle. Swift has been the advance from the dots and dashes of wireless to the voice and music of radio—and now onward to television.

Electricity, in its flow around the globe, carries progress to all men. Particularly in America, electricity has revealed its magic, for here freedom to think and freedom to develop ideas, stimulate pioneering achievement. In fact, in the United States it seems that scarcely a day passes that we do not learn something new about the electron and behold new and greater possibilities for its use.

We can learn something new every day and thus add to our knowledge. It is as true as ever that "Knowledge is Power." In this day of labor-saving devices and robot machinery, we have electronic computers which solve quickly and accurately the most complex scientific and mathematical problems. But such instruments provide no substitute for thinking. The human brain must continue to frame the problems for the electronic machine to solve.

The radio industry is mighty fortunate that Thomson discovered the electron at about the same time Marconi invented wireless. Indeed the electron proved to be the key to revolutionary advances in all forms of communication, and especially in radio and television. It is constantly extending our horizons and our orbits of knowledge. Today, the electron is opening new vistas to practically all other industries as it has done in all phases of communications. What once was "electrified" is on the way to being "electronized." We know that the electron has tremendous potentialities for development of new devices in the home appliance

field. We already have electronic stoves and cookers, and we may have electronic air conditioners, refrigerators and many other useful appliances. The home of the future may be electronically heated or cooled, and life everywhere made more comfortable. Already the power of electronics is being felt by motion pictures, the theatre and aviation. It is performing important tasks for the printing industry, and holds great promise for future developments in this field.

The electron has wrought such changes in our everyday lives that it can justifiably be compared with the historic discoveries of Galileo and Faraday. It has extended man's range of speech, hearing and sight, and through the electron microscope has opened a complete new world of the infinitesimal, hitherto unseen by the human eye or by any ordinary microscope. This achievement has already made great contributions to the advance of biology and medicine. Viruses, bacteria, human cells, blood corpuscles, tissues and nerve fibers, tremendously magnified, can be photographed and studied as never before.

The optical microscope is a century old but it is still in general use. The electron microscope is little more than a decade old; nevertheless, it has opened new fields of vision larger than those revealed by its predecessor. The electron microscope has already revealed to us a submicroscopic world to which we were formerly blind.

Through man's inventive and engineering ingenuity, electronic computers have been made to add, subtract, multiply and divide. Besides, they can memorize the results of these operations in such a manner that they are immediately available for another operation. There is every promise that these electronic systems can graduate from high-speed simple arithmetic to high-speed reading and writing too.

The information that we compress today on punch cards, tomorrow will be further compressed by storing the necessary figures and words on magnetic tapes which can be scanned at the speed of many thousands of words a minute. Methods of rapidly double-checking the results of the computer are being developed with success, so that one error in many billions of transactions should be a rarity. This increase in efficiency and drastic reduction in time and labor can result in economies of startling proportions. Since a computer's output, in its raw state, is in the form of electronic pulses, there are also possibilities for relaying these pulses simultaneously to remote points before reducing them to words and figures. The capabilities of our existing means of communication for swiftly transferring large quantities of information in electronic form are still far from being fully utilized. These modern robots promise to revolutionize and simplify the clerical operations of insurance companies, banks, tax bureaus, stock exchanges, and business in general. For example, in merchandising organizations, a single electronic computer can do the combined accounting of receivables, payables, purchases and stock control.

Television is only one of the avenues through which electronic light will flow into daily life. In other areas, the electronic light amplifier may be expected to lead to devices which will make vision possible in darkness. These will add greatly to the safety of our transportation on land, at sea and in the air. The perils of night driving, too, are likely to be reduced by electronic devices that will provide far-reaching light without glare. Like other major scientific innovations in the past, electronic light will open roads to improvements on existing products and processes, and will give birth to entirely new instruments, appliances and services.

An important step in electronics came in 1904 when Sir Ambrose Fleming invented the "valve" or wireless detector. It had a filament and plate, and when the filament was heated it emitted negative electrons which were attracted to the positively charged plate. It was not too sensitive as a wireless detector, but this type of vacuum tube took on great significance in the field of wireless and electronics when Dr. Lee De Forest, in 1906, added a third element or "grid" inside the tube. He called it the "audion" and it not only detected radio signals, but also acted as an amplifier and an oscillator. The "audion" was truly a great invention, for it was the master key to all phases of electronics.

As an industry, electronics began after World War II. Today all modern methods of communication—the telephone, telegraph, radio and television—are dependent upon the electron. Modern methods of mass entertainment also depend upon the electron. And this, of course, includes the phonograph, tape recording and reproduction, talking movies, radio broadcasting and television.

We would not have present-day aviation without the use and control of electronic devices. Modern warfare—which includes communications, radar, guided missiles, warning systems and signal controls—depends on the electron. Neither the power of the atom bomb nor the hydrogen bomb could be effectively controlled and released were it not for electronics. These services are not mere romantic possibilities—all of them are in existence today.

The great expanses of our universe will be probed and studied with increasing scope and accuracy through electronic means. Electronic developments now under way in the research laboratories, are destined to improve the vision of man. In astronomy, electronics will add to our knowledge of stellar physics and the far distant galaxies.

Our faith and persistence in pioneering television—first, black-and-white, and then, color—and our encouragement to others to get into the field, led to its present state of development which otherwise the American public might not have enjoyed for another ten years. Whether we succeed in completing an invention before others whom we stimulate to work along similar lines may do so, is not as important as it is to

bring a new product or a new service into existence and use. In helping industry to grow and prosper, we believe that we contribute to the public benefit and in the long run, our own as well. If an organization is to progress it must not stand in fear of obsolescence or competition. Electronics, in the race to achieve new triumphs, is run on the big track of Time on which there is room for all who would compete. There is no finish line.

The liberal arts should not shrug off advances in science and technology as too technical to understand. And engineers at their end, should not regard music and the arts as outside their natural domain. For more than a quarter of a century, the entertainment arts have felt the magic touch of electronics. As a result, music, drama, motion pictures, the phonograph and even journalism have taken on new dimensions. New interest has been created in them and their audiences have multiplied from thousands to millions.

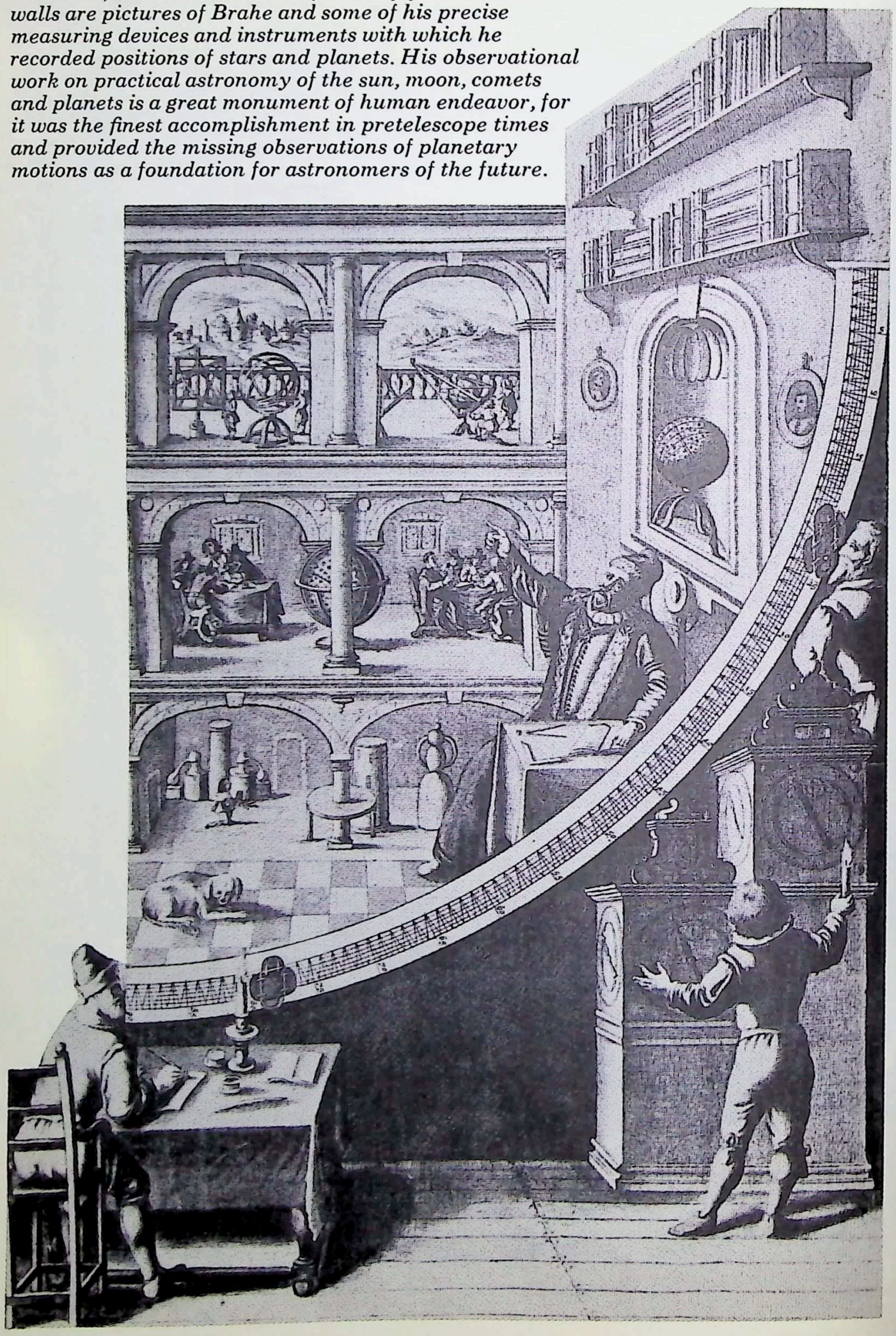
*Through his extensive experiments with light and discoveries in optics, Sir Isaac Newton (1642-1727), the great English philosopher and mathematician, became the founder of modern optical science. Through the Newtonian Theory, the mathematical key to the universe seemed to have been discovered. From that time onwards mathematics and physics advanced in leaps and bounds.*

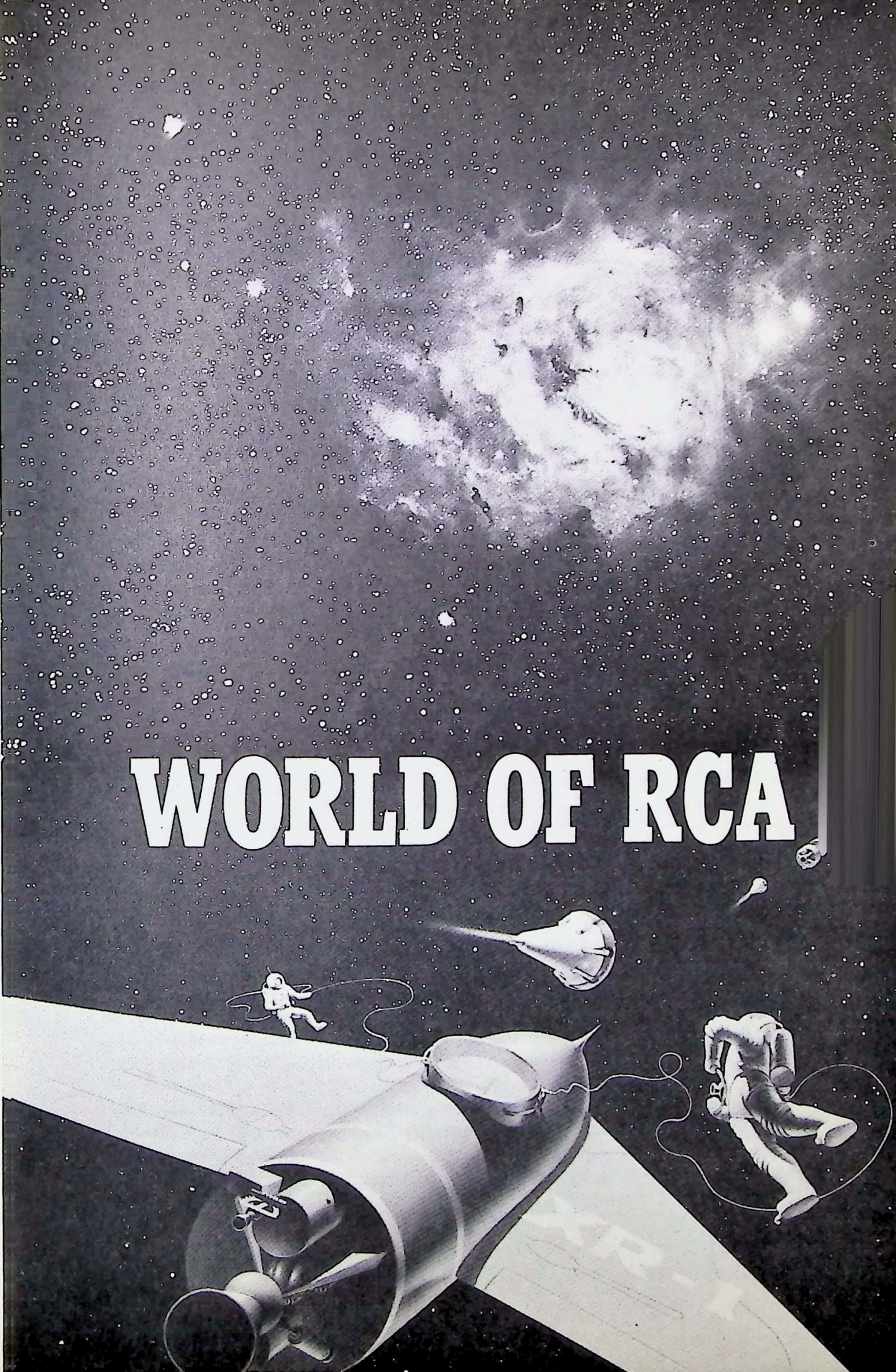
*Honorary Degree, Doctor of Science, Columbia University.*

"General Sarnoff's decorations and awards are numerous, but the list of his achievements is far longer. On behalf of a grateful nation, I salute him and hope we have the benefit of his creative genius for many years to come."

—PRESIDENT LYNDON B. JOHNSON

*The greatest observational astronomer of the sixteenth century was Tycho Brahe (1546-1601). This rare historic print shows his elaborate observatory in Denmark, in which he labored for many years. On the walls are pictures of Brahe and some of his precise measuring devices and instruments with which he recorded positions of stars and planets. His observational work on practical astronomy of the sun, moon, comets and planets is a great monument of human endeavor, for it was the finest accomplishment in pretelescope times and provided the missing observations of planetary motions as a foundation for astronomers of the future.*




WORLD OF RCA

RCA stands for Radio Corporation of America, which is engaged in numerous phases of radio, television and electronics. Among RCA's activities are research and engineering, design and development, manufacturing, domestic and foreign sales, international and maritime communications, radio and television broadcasting, technical training and servicing, and the granting of licenses under patents. These activities are conducted through the various RCA divisions and subsidiaries.

The Radio Corporation of America was founded in 1919 to provide the United States with an American-owned international wireless service. Today, RCA is a leader in virtually all phases of electronics. Its gross annual sales volume is more than $3 billion, and it ranks among the top twenty-five United States industrial corporations. The number of its employees has increased from 457 to 124,000. It provides some 11,700 different types of products and services for lease or sale in 120 nations and territories. The Corporation has more than 330,000 shareholders, and its divisions and subsidiaries maintain thirty-two manufacturing plants in the United States and nineteen plants in nine foreign countries.

RCA's activities cover the broad spectrum of electronics. They include the manufacture, sale, and servicing of electronic instruments for the home, radio and television broadcasting, electronic data processing, graphic systems, defense and space electronics, industrial and educational electronics, world-wide communications, operation and servicing of electronic equipment, book publishing, manufacture of electronic components, and research and engineering in electronics.

RCA has been a leader in the home entertainment industry since the early 1920s when it first began selling radio sets. A pioneer in the development of practical television service in both black-and-white and color, RCA is one of the world's largest manufacturers of home television receivers as well as studio and transmitting equipment. More people own RCA Victor television sets than any other make of television. The Corporation's research endeavors in color television started in 1930 and culminated in the introduction of compatible color television in 1954. RCA spent more than $130 million in the development of color television —one of the largest commitments ever made by a manufacturer to a new service.

In recent years, color television has become an increasingly important factor in the nation's economy. In 1964, color television in all its aspects attained the status of a billion-dollar-a-year industry. By 1967, there were more than seven million color television sets in use in American homes. By next year, the figure is expected to approach fifteen million. The phenomenal growth in color television set sales has been accompanied and encouraged by continued increases in the number of hours of local and network color programing, by a variety of picture-screen sizes, by reduced prices for color sets, and by further advances in color cameras and receivers.

In addition to a full line of black-and-white and color television receivers, RCA manufactures high-fidelity and stereophonic "Victrola" phonographs, radio receivers, home tape recorders, and hi-fi components. RCA Victor records provide a broad selection of classical and popular music. The RCA trademark, "His Master's Voice," is familiar to millions of people.

In 1926, RCA established the National Broadcasting Company, America's first radio network. In 1939, the Corporation was the first to

introduce television service to the American public. In 1951, NBC inaugurated its coast-to-coast television network; and in 1954 it introduced color television, using RCA's compatible color system. NBC's pioneering efforts in color television have been primarily responsible for the present high level of color network programing.

NBC has been the leader in color television broadcasting since 1954 when the network began its color operations with a schedule of sixty-eight hours of telecasting. This season, NBC-TV scheduled many more hours of color—including all of its nighttime programs—than the other two networks combined. NBC broadcasts network radio's most comprehensive schedule of news, sports, and information, highlighted by its weekend *Monitor* program. NBC International distributes programs to eighty-six countries and more than three hundred television stations throughout the world. The NBC owned stations all devote major efforts to community service through distinctive local programing combined with the NBC network schedules.

RCA launched a full-scale effort in the field of commercial electronic data processing in the 1950s, drawing upon more than two decades of research and development in computer technology and upon long experience in specialized data processing applications for the government. In 1958, the Corporation introduced the first completely transistorized general-purpose commercial computer system—the *RCA 501*—which represented an entirely new generation of electronic data processors. In 1960, the *RCA 301* was introduced as a versatile computer for general-purpose systems and was widely accepted in industry, government, and education. Later in 1960, RCA announced a large, ultrahigh-speed computer system, the *601*, capable of handling complex business and scientific problems. The line was further extended in 1963 with the *RCA 3301 Realcom,* a communications-oriented system whose uniquely modular design made it the first computer to span the full range of data processing capabilities in one system: business, scientific, real-time, and communications functions.

In late 1964, RCA introduced its new *Spectra 70* family of computers Employing integrated circuits in three of its five models, the *Spectra 70* series represents the first of a new third generation of electronic data processing systems. More than 1200 RCA electronic data processing systems are in operation in the United States and abroad. Users include commercial banks, insurance companies, utilities, the Armed Forces, various federal and state government agencies, newspaper publishers, manufacturers, and educational services.

RCA also produces peripheral equipment for use with its own systems and those of other manufacturers. Among these products are computer mass storage systems with multibillion character capacities, and video display units capable of interrogating computers and displaying the results. RCA has also developed electronic data gathering terminals that can report multiplant production information directly from assembly lines to management offices hundreds of miles away. In addition to its manufacture of complete systems, RCA is a producer of electronic components for the growing electronic data processing industry across the nation.

RCA is playing an increasingly important role in the exploration of space and ranks among the top contractors of the National Aeronautics and Space Administration. The company's space activities include

participation in the *Apollo* program, which will land United States astronauts on the moon; unmanned spacecraft projects to explore and photograph the moon; experimental and operational weather satellites; and experimental spacecraft.

The *Tiros* satellite series, designed and built by RCA for NASA, began with the launching of *Tiros 1* on April 1, 1960, as the world's first television observation post in space. A new era in the weather satellite program was initiated in 1966 with the successful launching of the *Essa 1* and *2* operational weather satellites for the United States Weather Bureau. The *Tiros* satellites which have been orbited have operated well beyond their mission requirements in what has been termed "the nation's most successful unmanned space program."

RCA's participation in NASA's *Ranger* lunar exploration program ended in spectacular fashion on March 24, 1965, when *Ranger 9* crashed in the crater *Alphonsus* on the moon's surface. Millions of Americans witnessed the event as live television pictures, transmitted a distance of more than 240,000 miles from an RCA-built space television system aboard the last *Ranger,* flashed on home screens across the nation. The RCA camera systems aboard *Ranger 9* sent back 5814 high-quality pictures, thus bringing to more than 17,000 the number of high-resolution photographs of the moon returned by *Rangers 7, 8,* and *9* within an eight-month period. The television camera systems for all the *Ranger* spacecraft were designed and built by RCA's Astro-Electronics Division. The ground-based receiving equipment for the *Ranger* television signals was built by RCA's Communications System Division, and the television recording and display equipment was built by RCA's West Coast Division.

In the nation's manned space flight program, RCA has been a major participant in the *Gemini* program and is a principal subcontractor in the *Apollo* lunar landing project. For the *Gemini* missions, the company provided much of the tracking radar and communications used by NASA around the world, and RCA specialists operated and maintained the communications and control channels for the *Gemini* missions at Cape Kennedy and on the Eastern Test Range. In the *Apollo* program, RCA is providing computers which automatically check out the *Saturn* launch rocket. RCA's Aerospace Systems Division also has the responsibility for supplying the rendezvous radar and transponder, the landing radar, the communications subsystems, the attitude translation and control assembly, the descent engine control assembly, and much of the test equipment for the lunar module that will carry the astronauts to the surface of the moon.

RCA is engaged in a number of other space projects. Among them: development of a special television camera for the Orbiting Astronomical Observatory; the tape recorder for the Orbiting Geophysical Observatory; the communications and power supply systems for the *Lunar Orbiter,* which took pictures of the moon's surface so as to enable our scientists to select *Apollo* landing sites; advanced vidicon camera systems, power supply, and automatic picture-taking equipment for the *Nimbus* experimental meteorological satellite; navigational satellite; world weather watch study; a study on a direct-to-home FM radio broadcast satellite; radars for the *Apollo* instrumentation ships; a study contract for an advanced *Tiros* satellite; a laser transmitter for space communications; a portable, completely microminiaturized video recorder for NASA; a dielectric tape system; and a sun pump laser that has possible applica-

tion for deep space communications.

RCA is among the leading industrial prime contractors to the United States Department of Defense. RCA designed, managed the construction of, and operates the USAF *Ballistic Missile Early Warning System,* a radar shield designed to give prompt warning of any missile attack that might be launched at North America or Great Britain over the top of the world. It also provides the electronic command equipment for the *Minuteman* missile network and has a contract with the United States Air Force to operate a tracking system used to detect, track, and maintain an inventory of man-made objects in space.

Among the key military endeavors in which RCA is engaged are projects dealing with: surface-to-air missile defense; computer-controlled test apparatus for electronic equipment; command and control networks for intercontinental ballistic missiles; equipment for secure message and circuit switching systems; highly accurate radar altimeters for fighter aircraft; several microelectronic programs with the Department of Defense; a military air traffic control system; a new type of aerospace computer; expansion of *Autodin*—a computerized high-speed information system that is the world's largest and most advanced military data communications network—designed, manufactured, and installed by RCA for Western Union; laser range finders; low-light-level television equipment; an optical surveillance system; troposcatter communications equipment; man-pack radios; a two-pound miniaturized radar for personnel use; tactical communications systems; tactical radars; a speech recognition device; advanced computer memories; and land combat support systems.

RCA markets a wide range of electronic equipment for broadcasting, education, scientific research, and communications. The company's Broadcast and Communications Products Division is a principal producer of studio and transmitting systems for radio and television broadcasting. As a pioneer in the development of color television cameras and other color apparatus, it manufactures this equipment in heavy volume for the television industry. RCA broadcast antennas atop towers and tall buildings radiate program signals to viewers and listeners in hundreds of communities across the country. Nearly 1500 RCA television tape recorders are in use by networks, television stations, and production studios in this country and abroad for recording and playing back programs in color or black-and-white. A new Instructional and Scientific Electronics Department is expanding the application of electronic systems, using combinations of television and audio-visual equipment, in education, training, science, and related fields. The Division also is a major supplier of closed-circuit television systems used in military, medical, banking, industrial, and other areas.

A Communications Products Department serves a number of other markets as a supplier of high-capacity microwave systems, fleet marine navigation and communications gear, and two-way mobile radio and high-frequency communications equipment. Other Division products include professional sound systems, the RCA electron microscope and other scientific instruments, and film sound-recording equipment. A separate RCA activity, the Industrial and Automation Products Department, designs and markets automated inspection, testing, measuring, and control systems.

The Graphic Systems Division, organized in 1965, develops,

manufactures, and markets new electronic equipment and systems for handling all types of printed information. In 1966, the Division announced a unique electronic type composition system, capable of setting the entire text for a newspaper page in two minutes through the use of television and computer techniques. Known as *Videocomp,* the system breaks individual letters into combinations of dots for electronic composition and is the first commercially available typesetter to employ all-electronic character generation. It is designed to work with RCA's *Spectra 70* computer series. Also introduced by the Graphic Systems Division in 1966 was an electronic color separation device, known as *Colorscan II,* which can scan color transparencies and break them down into the four color separations required for full color reproduction. *Videocomp* and *Colorscan II* represent the first phase of a broad program by the Graphic Systems Division to provide advanced electronic products for the printing industry.

RCA Communications, Inc., a wholly owned subsidiary of RCA, is the nation's leading international telegraph carrier in traffic volume. Its global communications network consists of almost one thousand radio, coaxial cable, and satellite channels, which provide the American public with international telegraph message service, telex—a teleprinter exchange—service to and from more than 115 overseas points, and leased-channel service to virtually every country in the world. These leased channels include the radio *Hot Line* that makes possible instantaneous communication between the heads of state of the United States and the Soviet Union, and a Washington-Moscow weather line over which United States and Soviet meteorologists exchange data for better world-wide weather forecasting. In addition, RCA Communications provides telephone service linking fourteen terminals in the Pacific, supplies two-way program transmission service for broadcasters around the world, and maintains facilities for photo transmission with fifty-six overseas points.

The company is equipped to furnish communications with ocean-going vessels and with ships plying the inland and coastal waterways of the United States, and it operates a data transmission service—*Datel*—for international transmission of computer-produced data. RCA Communications also provides intercontinental television transmission service by means of the *Early Bird* satellite. RCA Communications' Electronic Telegraph System handles nearly all of the traffic passing through the Central Office in New York City. Employing RCA computers designed especially for the purpose, this system electronically routes, processes, and transmits as many as six hundred overseas messages at a time without manual handling. The Electronic Telegraph System accommodates traffic transmitted by wirelines, microwave, coaxial cable, high-frequency radio, or satellite communications.

RCA's products and services are known and used throughout the world. The company's plants abroad produce home instruments, records, electronic components, and communications equipment, and RCA exports many products made in its American plants. More than 15,000 employees of the RCA Service Company are engaged at home and abroad in the operation and maintenance of electronic installations ranging from home television sets to giant radar systems. Within the scope of the RCA International Division fall the overseas distribution of products manufactured by RCA, the supervision of foreign subsidiaries and their

operations, and the negotiation and administration of patent license and technical aid agreements with companies in foreign countries.

The RCA Victor Company, Ltd., of Montreal, is one of Canada's leading electronics companies and is engaged in activities ranging from research and product development through manufacturing and marketing. It recently expanded its color television operations by starting the assembly of color picture tubes. It also completed the first Canadian earth station for satellite communications. RCA Great Britain, Ltd., operates and maintains the *Ballistic Missile Early Warning System* installation at Fylingdales Moor, England, and is engaged in the manufacture of color television picture tubes.

The RCA Service Company is one of the world's largest technical service organizations. It operates and maintains major electronic installations for the government at home and abroad; provides technical training, guidance, and servicing for electronic data processing and other business and industrial equipment; installs and maintains RCA home instruments and institutional electronic systems; and provides education for electronic technicians. The Government Services activity of the RCA Service Company is responsible for the operation and maintenance of the information gathering, data processing, and communications systems for the Air Force Eastern Test Range, the 10,000-mile-long course along which missiles are fired from Cape Kennedy. In addition, it was selected to plan, install, operate, and maintain the technical communications for the nation's great new NASA Spaceport at Merritt Island, Florida. The company also operates and maintains the *Ballistic Missile Early Warning System* sites in Greenland and Alaska, and provides extensive electronic services for the United States Government at defense installations around the world.

RCA Institutes, Inc., a leader in the education of electronics technicians, provides training in its New York City resident school for electronics and associated careers as well as preparation for careers in television production and broadcasting. Its home study school offers correspondence courses in electronics, communications, automation, programing, drafting, and other electronics-oriented subjects. It also provides specialized technical training in electronics at the RCA Technical Institute at Cherry Hill, New Jersey.

RCA is engaged in publishing through its wholly owned subsidiary, Random House, Inc., which it acquired in 1966. Functioning as a separate entity with complete editorial autonomy in the hands of its own Board of Directors, Random House is one of the nation's leading publishing houses. Organized in 1925, Random House, Inc. is presently engaged in a broad range of publishing activities, including textbooks, reference works, and trade books. It is one of the most successful publishers of juvenile books in the United States.

RCA is a leader in the development and manufacture of the "building blocks" of all electronics—tubes, transistors, integrated circuits and other solid-state devices, and special electronic components. RCA's Electronic Components and Devices organization produces electron tubes, transistors, integrated circuits, memory components and other solid-state circuit devices for the computer, home entertainment, industrial, defense, and aerospace markets. In all, RCA provides more than 1500 types of electron tubes, 3000 types of semiconductor devices, and 1500 other component items.

RCA is the leading producer of color television picture tubes in the television industry. To support continued growth, the company has spent more than $100 million on expansion and new construction of its color tube facilities. A color television picture tube plant in Scranton, Pennsylvania, and an electron-gun plant in Juncos, Puerto Rico, were built in 1966 to help meet the increasing demands for color picture tubes. The RCA Television Picture Tube Division produces the shorter 25-inch, 22-inch, 19-inch, and 15-inch rectangular color tubes as well as the 21-inch round shadow-mask tube. All RCA color picture tubes are manufactured with a new rare-earth phosphor that provides brighter and more vivid color pictures, and incorporate a new feature called *Perma-Chrome*. This provides temperature-compensated shadow-mask assemblies and temperature-stabilized screens for "locked-in" color performance through the change of temperature from the turning-on of the tube until it is fully warmed up.

RCA launched a major engineering, development, and production facilitation program on integrated circuits in 1963. Substantial progress was made on this program during 1964 and 1965, and a complete line of digital and linear integrated circuits was announced to the industry in November, 1965. RCA-designed integrated circuits are used in the *Spectra 70* computer, the first full-scale commercial computer to use integrated circuits. Specially designed integrated circuits are being used in the sound systems of RCA Victor color and black-and-white television sets. Other developments by RCA Electronic Components and Devices include the first transistor which operates directly from house current, making solid-state phonographs and AC/DC radios economically practical; a sensitive-gate *Triac* semiconductor device that substantially improves the performance and usefulness of more than seventy-five per cent of the electrical appliances now found in the home; and a *MOS* field-effect transistor which combines the best advantages of the two worlds of electronics, the electron tube and the transistor.

In advanced technology, RCA Electronic Components and Devices has developed and marketed a new superconductive ribbon and high-power superconductive magnets that will enable laboratories to carry out experiments that would otherwise require large multimillion-dollar facilities to generate powerful magnetic fields for solid-state and atomic research. The Industrial Tube and Semiconductor Division established a new Electro-Optics Department to further the development and manufacture of injection lasers and optical diode devices.

A dynamic program of basic and applied research underlies all of RCA's diverse activities in industry, defense, and consumer markets. This comprehensive program embraces both theoretical and experimental work at the company's central research facility—the David Sarnoff Research Center, Princeton, New Jersey—and extensive applied research and advanced development activities by engineering staffs of the various RCA product divisions. This RCA technical team numbers approximately 6000 scientists and engineers. The research center at Princeton is one of the world's largest laboratories devoted entirely to electronics. Among its achievements have been the development of all-electronic color television, including cameras, transmission system, and receivers; the monolithic ferrite memory and other advanced computer memories; the germanium-silicon thermoelectric material for converting heat directly to electricity; and the niobium-tin vapor deposition process

used by RCA to produce a unique line of superconductive magnets capable of sustaining magnetic fields of up to 100,000 gauss.

RCA's scientific staff concentrates today on such areas as new solid-state components, integrated circuitry, new television display systems, thin-film technology, computer memories, superconductive materials and devices, direct energy conversion, and novel communications systems employing plasma devices, lasers, masers, and other advanced components. In addition to the Princeton research facilities, laboratories are maintained in Zurich, Tokyo, and Montreal, in cooperation with the International Division of RCA.

Among the large and growing family of products and services created by the Radio Corporation of America, numerous individual performance records were set last year. Cumulatively, they provided RCA with more profits, more sales, and more scientific and technological progress than ever before in the company's forty-seven-year history. As significant as the rate of RCA's growth were its nature and direction. Color television provided the greatest single stimulus, but vigorous activity also marked other product and service areas of major potential, including broadcasting and electronic data processing. The emergence of color television as the nation's fastest-growing industry, under the continuing leadership of RCA, was one of the major business news stories of all time. This was the year in which RCA's pioneering efforts in color reaped their greatest reward—but it was still only a beginning. Today, there are approximately seven million color television sets in use in the United States. However, black-and-white sets are installed in ninety-five per cent of all American households, in contrast to color's ten per cent. The unfulfilled domestic market for color represents a minimum of fifty million receivers, and color will probably require about ten years to reach the present level of black-and-white. Concurrently, color should begin its growth spiral on a world-wide basis, with RCA as an active participant. RCA has made extensive preparations to maintain its leadership throughout this growth era at home and abroad.

The progress of color should not, however, eclipse the fact that four out of every five dollars of current RCA business derive from other areas of the company's activities. RCA's planned expansion in consumer products, for example, includes projected sales growth in radios, "Victrola" phonographs, stereo units, magnetic tape recorders, RCA Victor records, and stereo tape cartridge musical recordings for automobiles. These products will figure significantly in the growing market generated by a youthful population that is assuming the numerical majority in this country.

The National Broadcasting Company continued last year to produce nearly one quarter of RCA's total sales. The past year was the sixth in succession for new peaks of NBC sales and profits. As the nation's economy grows, further improvement in this sales and profit pattern is expected, based to an important degree upon NBC's association in the public mind as the *Full Color Network* and upon its leadership in both informational and entertainment programing.

The electronic data processing business operated profitably last year for the fourth consecutive year. By 1970, profits from the data processing business, including computers, communications equipment, electronic displays, licensing, and service, are expected to become a highly significant factor in RCA's total earnings. Government sales currently account

for less than twenty-five per cent of RCA's total volume, compared with thirty-seven per cent at the beginning of the decade. RCA continues to serve as one of the country's most important contributors to national defense and to the exploration of space, which represents a major portion of our government business.

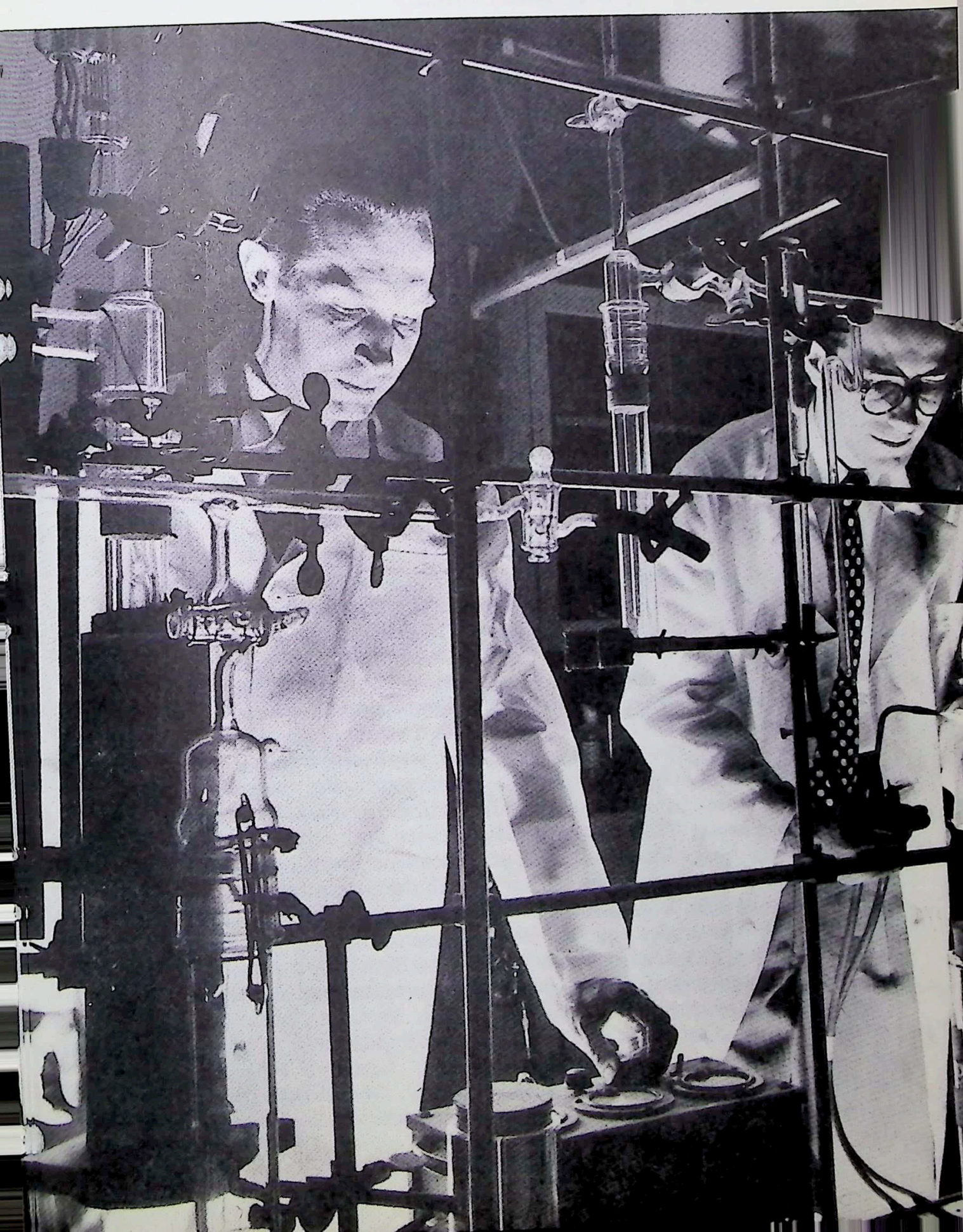
RCA leads in the design and development of television systems for space, as typified by the remarkable television pictures transmitted by *Ranger 9* from the moon and shown simultaneously on home receivers across the nation. It brings extensive experience to bear in missile and spacecraft tracking, command, and interrogation. It is a leader in the development of radar systems for these functions. It is one of the leaders in laser and maser technology for communications, range-finding, and warning systems. It is preparing for growth in the new area of electronic services for underwater exploration and development of the resources beneath the sea.

Behind all of RCA's advances stand the creative efforts of more than 6000 scientists and engineers at the RCA research laboratories in Princeton, New Jersey, and at other engineering, production, and service centers of the company. Together, they are creating concepts for the systems and products that will shape RCA's future. The concepts of the scientists, in turn, are being translated into reality by 118,000 other men and women of RCA engaged in producing and marketing RCA's 11,700 different products and services in scores of countries around the world. These skills and talents support the management's confidence in the future of RCA and of the industry in which it stands forth as a world leader.

America's spirit of freedom to research, freedom to invent, to produce and to serve in peace as well as in war gives it a bulwark no other nation possesses. Free enterprise and free competition make America strong, and RCA, as a part of one of the major industries of this country, aims to do its part in contributing to national security and to the future growth of the nation's economy.

*Bennett Cerf, chairman of the publishing organization, Random House, a subsidiary of RCA, is not only America's best known book publisher but a famous editor, author, lecturer, newspaper columnist, anthologist and television panelist. He is shown here with Wisdom Magazine the day the Editors of Wisdom conferred upon him the Wisdom Award of Honor in recognition of his distinguished achievements in publishing, literature and education.*

# THE WISDOM OF SARNOFF ON RCA



There are many functions involved in directing the affairs of a large corporation. My company, the Radio Corporation of America, creates thousands of different electronics products and services for most of the nations of the free world. Of necessity, the head of such a company is involved in many different activities, and many of them are deeply rewarding. But if I were asked to choose the single activity that gives me the greatest personal satisfaction, I would say it is our scholarship program. To possess the most priceless of all gifts—the capacity to think and to learn—is to be indeed fortunate. I say this for two reasons and the first is a very personal one. I was not, myself, privileged to have a full formal education and spent many years of my young life yearning for one. To be able, therefore, in some small measure, to help other young people satisfy that yearning is to me a reason for profound gratification. The second reason is that I have had the good fortune, through the character of my work, to live in the fellowship of brilliant scientists, researchers and scholars—and I am thus able to gauge at first hand the limitless contributions that science is making, and will continue to make, for the betterment of all mankind. I believe deeply that investments in scholarships for scientific and technical training are the most important investments in the future that any corporation or any individual can make.

It is true that some companies make a practice of hitching on the research tailgate of others and thus amassing fortunes by following instead of pioneering. But someone has to pioneer—otherwise there would be no progress and no profits for the leader or the follower. It is frequently true in industry, as it is in other walks of life, that the path of the pioneer is strewn with man-made obstacles that must be overcome, if we are to advance.

RCA pioneered and established the most efficient system of world-wide radio-telegraph communication, against the opposition of the long-entrenched cable companies. It pioneered in developing and establishing the use of sound-on-film "talkies" in the face of stubborn resistance by motion picture producers, music publishers, and others in the entertainment business. It pioneered in sound-broadcasting and established the first nationwide radio network, despite the vigorous opposition of phonograph and record manufacturers and others who were against free entertainment for the public. It pioneered in producing black-and-white television sets and in establishing a television network to provide programs for the home. This created a new service and a vast new industry. But here, too, opposition to RCA's efforts came from many sources—from some government officials, movie and theatre interests, and even from some radio-manufacturers and broadcasters! And, RCA pioneered in producing television color sets and color programs. Just think where the Communications, Radio, Phonograph and Motion Picture Industries would be today, without these basic developments born of research and pioneering in electronics.

RCA is and always has been research-oriented. And it has not hesitated to blaze the trail with new products and new services.

Modern life has acquired tremendous dimensions of power. A new dynamism is at the heart of science. Revolutionary advances that would have required decades in the past are today brought to fruition in a few years. That dynamism manifests itself in a fast moving cycle of discovery, invention and obsolescence, and we cannot afford to lag behind. It is no longer enough to think in terms of what we know. Always we must think in terms of what we need to know.

Some wonder what philosophy prompts me to often reveal new developments publicly while they are still in the experimental stage. Why do we not wait until they have been completed as commercial products? My answer is simple. Completion can be as stimulating in research as in manufacturing and merchandising. Scientists deeply concerned with research and pioneering development, are well aware that the number of people willing to risk their money in research and pioneering is very small compared with those who are ready to risk their capital in established enterprises operating profitably. In television and in other instances—where the information is not "classified" and does not involve our national security—RCA has continually made progress reports and released information that enabled others not only to catch up but at times even to move ahead of us. We welcome competition. It spurs our own activities and increases the possibilities of earlier achievement of desired results.

There is no satisfaction that can come to the head of an organization greater than to be able to sit back and watch the results achieved by men under his direction without having to give them orders or tell them what to do. Give them the mission and let them perform. Let them make their mistakes, too, because no one is perfect. There is only one way to learn and that is by the mistakes you make as you go along. But the mistakes must not be such as to cause grave consequences.

When a businessman thinks about the problems of his own company, he cannot fail to recognize that they are closely related to the fundamental problems that beset the world today. Neither researchers nor businessmen, working by themselves, can solve these problems. But, working together, they can do much to help find the practical solutions.

Progress comes through pioneering effort and leadership. And it is here that we meet the human element. No one objects to another fellow doing the job of pioneering. No one objects to another fellow researching, developing, spending his money, and doing what he can to create new inventions and new services. It is only when he begins to translate his efforts into profits for his shareholders, or those who risked their money on his judgment, that he meets opposition. Those who sat quietly and comfortably at home, while the pioneer was busy outdoors braving cold weather, forget the past, and see only the present. The success of the pioneer invites envy, breeds jealousy and stimulates conflict. In a sense, it can also be a stimulating element; for out of such competitive conflicts

often come further advances. No man has a monopoly on brains. No organization has all the knowledge required in a continuously changing and developing art and industry.

Scientists have patience and persistence. Generally, they have more time in which to do their work. But businessmen, who live "under the gun" of the highly competitive fields in which they operate, try to meet today's problems today. They are inclined to be impatient when they do not find a ready answer. Research men know that with time there is an answer to most things. Those businessmen who do not appreciate the value of research might have long since abandoned the search for a cure for cancer as a hopeless one. But the men of science and the people in industry who support them will never abandon that search until they find a cure . . . and I feel certain they will find it. That positive statement is based on my faith in the men of science and their ability to deliver.

Time and time again men in research at RCA have been asked to solve a problem and they have rarely let us down. It is like watching a magician to see them pull an electronic rabbit out of a scientific hat. My entire business career has been built on my faith in the ability of our men of science to produce the things for which we could discover a public need.

Keep in mind that any product, no matter how fine it may be technically, is worth little unless it can be produced and sold at a price the public can afford to pay. This is what the businessman has in mind when he talks about a realistic approach to his problem.

Businessmen should give understanding and encouragement to men of research. The principal tool in research is the mind of the scientist. Brains that radiate new ideas and new knowledge are not commonplace in this world. And we have great need of them. So let us be sure to handle them with understanding and with care.

Research does cost money. It is true that the scientist, alone, sitting on a hilltop, may conceive the idea for an invention. If it is simple enough, perhaps he can build a sample in his own little workshop. But for most products, it is a long way from the idea to the production line and public acceptance. That line leads through expensive laboratories, expensive equipment, and expensive promotion and exploitation. Taxes being what they are, the day of the private philanthropist has pretty well gone. The wealthy patrons who sponsored men of science, just as they sponsored musicians and artists and writers, are fading from the picture. Who is to foot the bill? Some people say that the government should do it. And you may be sure that if industry doesn't do it, government will have to do it. But we all know that any time the businessmen of the country fail to meet a revealed public need and abdicate their responsibility to government, they are fostering the very thing they want least. That is, increased government control of the daily lives of all the people.

I firmly believe that government control of research would destroy the very qualities that enable researchers to make such an important contribution to society. For government control means that rigid lines would be set for research; and these lines may not meet changing requirements. Certainly industry is best qualified to define its own research needs. And the partnership between research and industry loses its meaning when government can dictate the subject and objective of research in any competitive system of private enterprise.

The only money the government has is the money it gets directly or indirectly from industry and the people industry serves. If, then, government supports industrial research, business will still be paying for it. Therefore, it behooves businessmen, in their own self-interest as well as in their public interest, to bear their fair share of the financial load.

I would be the last one to want to exclude government from scientific research. There are certain fields where the primary responsibility for specialized research belongs to the government. This is especially so in the field of armaments and weapons of war. There is need for government participation in research projects concerned with our national defense. But if the way were ever to come when the primary responsibility for industrial research rested in Washington, all of us, I am sure, would regret it.

The wonderful thing about research is that the more of it you do, the more of it there is left to do. Like the Horn of Plenty, it is never empty. It is like hunting a word in the dictionary. Each word is defined in terms of other words. So, when you seek a definition, you are inevitably led to another word that suggests new ideas. Just so, each piece of research opens new fields for further exploration.

There are some companies in America that spend millions of dollars on advertising and sales promotion, but still refuse to spend a cent on research. They say they are putting their money where it "pays off." It is not for me to tell another man how to run his business, but I believe these companies would find—as I have found—that it would "pay off" many times over if they were to make even a small investment in practical industrial research.

I shall always remember one afternoon back in the twenties when Dr. V. K. Zworykin, the electronic genius, came to my office with a tale of magic. He told me he had invented an electronic "eye." For half an hour I listened intently, and then exclaimed, "It's too good to be true. What will it cost to develop the idea?" "Maybe about $100,000," answered Zworykin. "All right," I said, "it's worth it." My hunch was strong that, before the idea could be developed into a practical system of electronic television, Zworykin's figure would prove to be only the cost of admission. But the idea seemed to me sound. So I bought the

ticket. Many years and much money went into this effort before we could raise the curtain on commercial television. And I was not disappointed. By the time we raised the curtain and invited the public to come in, we had spent fifty million dollars!

Today, there are millions of television sets in the United States and there will be millions more. Out of the parent industry there are being born healthy children: industrial television, whereby a factory manager can sit in his office and watch the work going on in all his plants; a department store chief can watch from his desk the traffic on all his floors; medical television, whereby a specialist in New York can watch and direct an operation in San Francisco; the electron microscope, which enables specialists in their medical laboratories and students in their classrooms to view enlarged slides of bacteria hitherto invisible by any other means. Consider what all this means to better living and industrial progress! Do you think all these developments, and more to come, from this pioneering effort in research are worth the fifty million dollars RCA put in television before we ever got a cent back? I do.

Research people are receptive to guidance. Nobody wants to work in a vacuum. A song writer wants to produce songs that will be sung, and a researcher wants to produce products that will be used. Businessmen can help their researchers by suggesting to them the products and services they believe will enjoy the greatest public acceptance. Experience has taught me that men in research will respond to the challenge of such suggestions.

I know of no better formula for success in business than this—look around you . . . see a product or service the public needs . . . then ask your researchers to develop it, your production men to manufacture it, and your merchandisers to sell it.

In our efforts to solve production or merchandising problems, we cannot permit direction of research to become too rigid. Industry is interested primarily in applied research, and this feeds upon new knowledge revealed through basic research. Therefore, we cannot afford to put blinders on our scientists.

They say that no one knows the way a football will bounce. Nor does one know where scientific research will lead. The history of science provides many examples of accidental discoveries that led to unexpected developments. Specific research projects often result in collateral discoveries. And frequently those collaterals turn out to be more important than the original object of the search. Just as Columbus, seeking a route to the Orient, discovered a new world, so scientists, working on a specified project, have come upon unexpected new worlds. Goodyear accidentally spilled a sulphur-rubber mixture on the kitchen stove and invented the process of hot vulcanization of rubber. Carothers created nylon as a

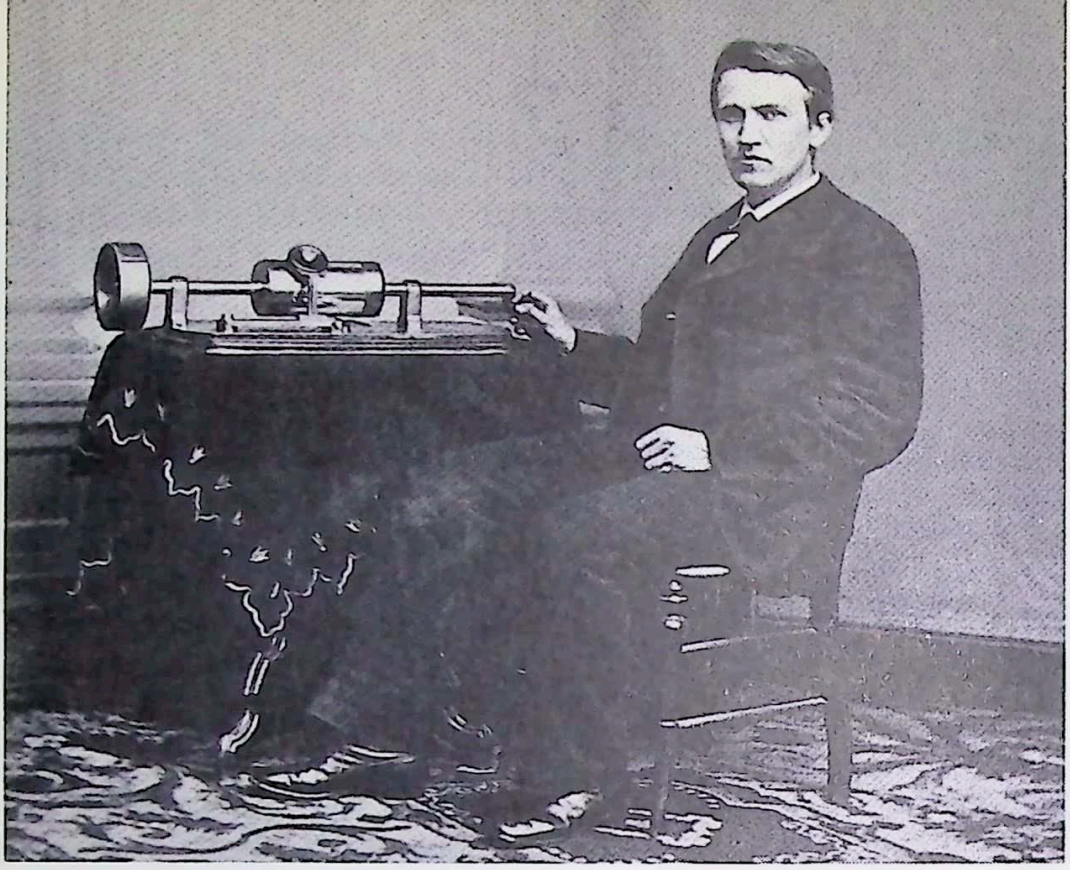
result of his pure research efforts to create giant molecules. Sir Alexander Fleming, the English bacteriologist, discovered penicillin while carrying on research on influenza when some mold accidentally got on one of his culture plates and created a bacteria-free circle around itself.

One of the benefits that appeals to me most about research is this—you hire one research man and you get several thousand of them, for such is the close working relationship and the exchange of ideas in this field that each research man profits by and builds on the work of all the others. I firmly believe that research is a good buy, and I am happy to see that businessmen in increasing numbers are coming to recognize that fact. Businessmen, who live by trade, are in a position to bring to their researchers a realistic picture of the fields in which they should explore if they are to serve the public interest.

In our zeal for applied industrial research, let us not forget that it all rests on basic research. And that through basic research any one of us may hit the jack pot. Businessmen should tell their researchers what they do want them to work on. But they should never get in the habit of telling them what they don't want them to work on. We cannot and we must not put straightjackets on men's minds. Businessmen can and should bring to this partnership their money, their encouragement, their advice, their ability to make available to the public the things that researchers develop and, above all else, faith in the sincerity and ability of scientists to produce results.

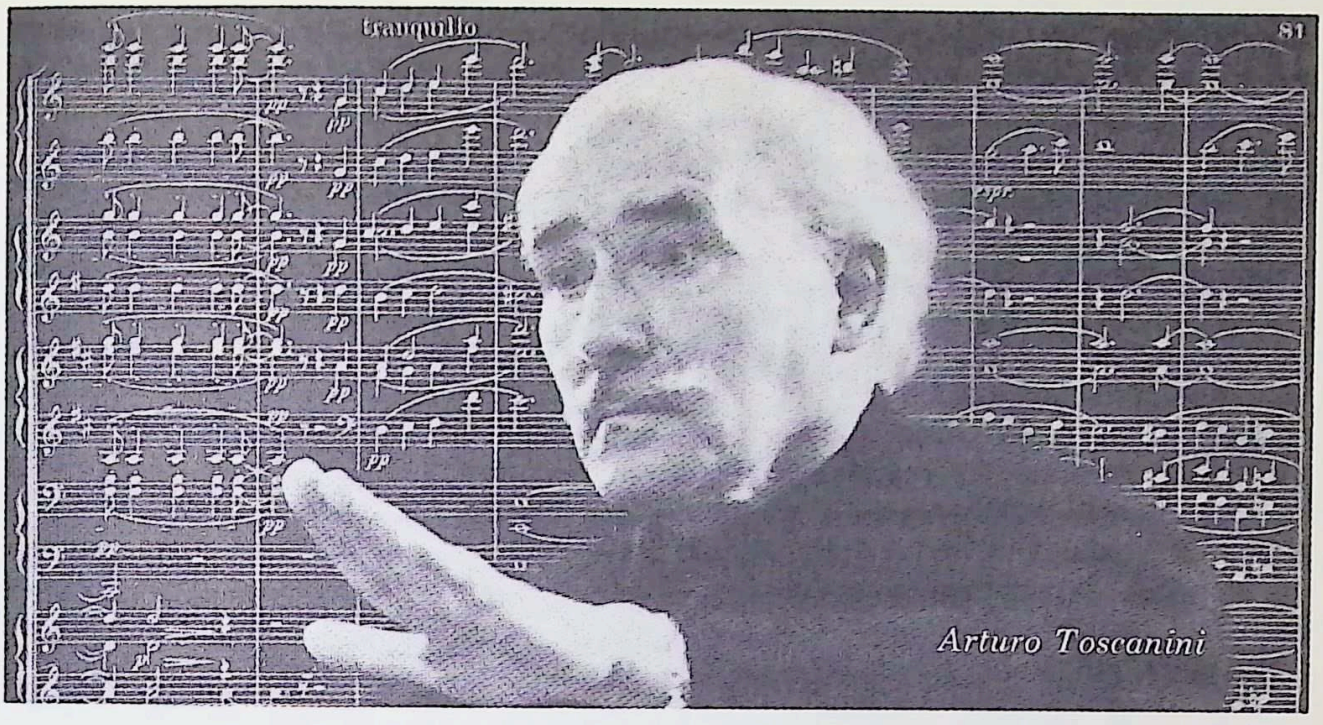
In the words of Dr. Samuel Johnson, "The future is purchased by the present." I know of no better way for industry to assure its future and our country's future than to join wholeheartedly in the full utilization of scientific research for the common good.

*Will Durant, the world's greatest living philosopher, historian, scholar, and author of the monumental 10-volume "Story of Civilization," is shown reading Wisdom Magazine during the time he collaborated with the Editors of Wisdom on a special edition which was devoted to his wisdom and published in tribute to his distinguished achievements in philosophy, history, literature and education. An eminent recipient of the Wisdom Award of Honor, Durant was one of the notable Americans to inspire and encourage the creation and publication of Wisdom.*



*Thomas Edison with the phonograph he invented in 1877. In 1878, when he was 31, he went to Washington to demonstrate it to the American Academy of Science, to members of Congress, and to President Rutherford Hayes. This picture was taken at the studio of the noted Civil War photographer Mathew Brady. The news of the invention of the phonograph had an impact far surpassing any previous scientific innovation.*

*Technical skill is blended with artistic talent to produce RCA Victor Records, representing the finest in recorded music. Here General Sarnoff is shown inspecting a new record. Under his leadership, RCA Victor Records has maintained an outstanding catalogue of classical recordings, continuing a tradition that began in 1902. RCA, as the pioneer in research, engineering and craftsmanship, continues to lead in every major advance in records and electronic instruments.*




# A WORLD OF MUSIC ON RCA VICTOR RECORDS

Before the dawn of the recording era, music lay dormant on sheets of paper, exactly as composers marked it down. It came to life only when performed by living artists. But audiences were limited to the largest cities and to the nobility and clergy, who were patrons of the arts. Some of man's most stirring accomplishments in music were heard at relatively infrequent intervals. Many people never heard them at all. Then science joined the arts, and with the advent of recording, music became a living medium. Brilliant individual performances could be heard and reheard whenever desired. For music lovers everywhere the phonograph became the realization of a long awaited dream—great music in the home.

Music lovers who crowded around the new Victor Talking Machine were too thrilled at hearing music on records for the first time to be critical of its quality. Technical and artistic improvements followed, as music lovers evinced a strong desire for recorded music of increased faithfulness to the original performance. RCA Victor acoustical engineers, acutely aware of this desire for greater realism, strove to duplicate actual musical performances through records and phonographs. The path to that goal was not an easy one. Many obstacles had to be overcome. But each thrilling achievement resulted in another advance toward music on records as it sounds in actual performance.

Today's all-time popularity of recorded music and the "Victrola" phonograph comes at a fitting time in the life of this great art and industry—a period immediately following Edison's invention of the phonograph. The evolution of recording, from Edison's famous 1877 tin foil model of the "talking machine," and the first notable operatic discs of 1902, to the present-day high fidelity reproduction of the world's finest music in all its tonal grandeur, provides eloquent testimony to America's quest for musical progress.

Recorded music is a unique combination of scientific and artistic achievements. An outstanding musical performance in either the popular or classical field must go hand-in-hand with outstanding technical performance in order to attain outstanding recording and reproduction. The degree of success in reaching this goal is measured best by public acceptance. Millions of families in the nation now have record players, and more and more record players are going into American homes each day. Millions of new discs of all sizes, speeds and classifications keep them spinning, playing music old and new.

Records have become the mainspring for the entire music business. In addition to their growing importance in home entertainment, they are an essential factor in many radio programs, some of the most successful of which derive exclusively from disc playing. They are a prime necessity of musical education in schools. Many of the artists now featured on radio and television owe their start in show business to early recordings. Countless newcomers who have become favorites in entertainment depend on records to extend their popularity.

Recordings today encompass all types of music—the best in symphonies, operas, chamber music, popular and jazz music, as well as folk, country and Western songs, children's classics and foreign-language favorites. Almost every avenue of musical progress has been traveled by the record-makers. In addition, they have transcribed for all-time the towering messages of men and moments of contemporary history, literary and theatrical masterpieces, instruction in languages and the elusive sounds of nature. Only the written word can today match the recording

art in making accessible to everyone the variety and scope of material marking our cultural achievements.

The phonograph has come a long way. In its association with radio and electronics, it has been imbued with a modern spirit and vitality far beyond the fondest hopes of the recording pioneers. The introduction of the new record speeds, together with longer playing characteristics and vastly improved tonal quality, has stimulated the whole field of recording. Far from confusing and frightening the public, as many prophesied, the new speeds supplied technical advances sparking unprecedented interest in records. These speeds represent a radical departure from the conventional 78-rpm records and establish a new standard of musical enjoyment. The RCA Victor systems have won universal acclaim for their distortion-free music of remarkable brilliance and clarity of tone, and are regarded as the greatest advances in years of recorded music.

Early in the summer of 1953, RCA stirred wide interest in music circles by its entrance into the field of high fidelity sound for the home. This was acknowledged by many as symbolizing the coming of age of the "hi-fi" movement. It elevated this fascinating outgrowth of the broadcasting and recording arts on a basis of professional quality. Much speculation has existed as to the place and date of origin of the "hi-fi" movement. While now international in scope, it seems to have had its beginnings about thirty-five years ago among an exceptional group of hobbyists in this country, who were determined to build or select and assemble components providing high fidelity reproduction of fine music for added home entertainment. The originators of the idea, and today's growing numbers of "hi-fi" enthusiasts, have concluded correctly that for each of them individually the end result of pleasing reproduced sound is attainable only through their personal selection of components—because they have their own individual way of responding and because the physical surroundings in which they are accustomed to listening differ from other listening areas. RCA scientists pioneered in high fidelity sound in the motion picture industry, for film recording and for theatres. Their contributions to the record industry have likewise been outstanding.

Radio Corporation of America, as the leader in bringing to the public outstanding advances, as well as in extending the horizons of home entertainment, is constantly alert for new developments. It is fully aware of the potentialities and promises of the recording art in the decades ahead, and can be depended upon to assist scientists and artists working together for the truest musical reproduction that human ingenuity can achieve.

"The Music You Want When You Want It" is widely known as an RCA Victor slogan—but it is more than that. It is an explanation of the phonograph industry's past success and the assurance of its future. Edison's invention of the phonograph brought into focus the dramatic story of sound recording, especially as related to music. The pages of recording history are marked by the inventive genius of Thomas A. Edison and of Emile Berliner, the craftsmanship of Eldridge R. Johnson, and an array of musical immortals that include Caruso, Scotti, Tetrazzini, Chaliapin, McCormack, Schumann-Heink, Bori, Farrar, Paderewski and Toscanini, to name but a few.

The idea of recording and reproducing sound by mechanical means belongs to the ages. Many inventors, among them a French scientist named Leon Scott, tried repeatedly but unsuccessfully to achieve it.

Scott's device, which he called the "phonautograph," came to public attention in 1857. It recorded sound in the form of an undulating line on a cylinder coated with lampblack. The shortcoming that doomed the experiment was the inability to reproduce the recorded material. History tells no more of the French scientist nor of his frustrating effort. But twenty years later, in America, Edison independently tackled the idea and made it work. In so doing, he showed the way to the modern phonograph. His original invention, crude as it was, startled the world. He was the first man to discover how to reproduce sound, including the human voice.

Edison had been experimenting on an automatic method of recording telegraph messages, when he hit upon his plan to create a machine that would talk. He sketched the apparatus and had his master mechanic, John Kruesi, put the parts together. The machine consisted of a grooved cylinder around which tin foil, stiffened with antimony, was wrapped; a diaphragm and needle which rested on the foil; a mouthpiece to speak into; another mouthpiece, or funnel, for outcoming sounds; and a crank to turn the cylinder. On the occasion of the first demonstration, Edison set the needle at the beginning and recited into the mouthpiece the nursery rhyme, "Mary Had a Little Lamb." He reset the needle at the beginning, resumed his cranking and out of the funnel came a squeaky reproduction of the rhyme. The machine talked!

Despite the fact that Edison already was a famous inventor, he and his associates lacked funds in that year of 1877. One of the associates decided to try to raise money by lecturing on Edison's inventions. One night in Buffalo, New York, he mentioned that a device for recording sound was under development. The next morning, a newspaper headline announced that Edison had invented a "talking machine." Thus the descriptive term was born.

The home entertainment possibilities of Edison's cylinder-type machine were not immediately recognized. The inventor, busy on other projects, gave little or no thought to refinement or to the commercial aspects until several years later, when he learned that the rival Volta Laboratories had begun filing patents on sound reproduction. Volta, headed by Dr. Alexander Graham Bell, his brother, Chichester, and Charles Sumner Tainter, brought out the first successful records in wax. Early in the 1880's, they had developed a wax cylinder on which sound grooves could be cut spirally. To play the records they had built what they called the "graphophone." Spurred by this rivalry, Edison once more turned his attention to recording. He, too, brought forth a wax cylinder and a machine for reproducing the sound recorded on it. His machine became known universally as the phonograph.

Records of both Edison and Volta were made by the "hill and dale" method—that is, the sound vibrations were translated into elevations and depressions in the bottom of the record groove. Both the Edison phonograph and the Volta graphophone employed a special feed-screw mechanism to move the sound box and other connected parts along the cylindrical record. The reproduction quality and the articulation were good, but the volume was so low that listeners were required to use ear tubes. These instruments more closely resembled some of today's dictating machines than they did the phonographs that eventually came into service.

These machines and records had just reached the public in 1888, when another inventor appeared on the scene with a radically different

idea. Emile Berliner, German-born telephone expert of Washington, D.C., noted for his invention of the microphone, introduced a gramophone, which featured the world's first flat disc. Berliner called it a "phonautogram." Berliner's system, moreover, included a manufacturing technique which provided a master record from which duplicate copies could be made. The flat disc had a groove that not only vibrated the phonograph needle to reproduce sound but piloted the sound box and horn across the record. The record vibrated the needle laterally by means of modulations in the walls of the groove, as opposed to the "hill and dale" method used by his rivals. The record industry, only a few years old, was suddenly caught in a struggle for supremacy between the flat disc record and the cylindrical record. It had to be one or the other, since the records of one system could not be used on the phonographs of the other.

A dramatic succession of advances began when Berliner, aware that his phonograph needed improvements and alterations, took it to the Camden, New Jersey, machine shop of Eldridge Johnson, an expert in the mechanical craft. Johnson, fascinated by the talking machine, at once saw its possibilities. His own words, as recalled later, were these: "The Berliner instrument was badly designed. It sounded like a parrot with a sore throat, but it caught my attention and held it fast and hard. I became interested in it as I had never been interested in anything before. The talking machine was a new art with a boundless future waiting only to be developed. The talking machine fever broke out all over me."

Johnson took Berliner's machine, and was so successful in improving it that he was given a contract to produce the machines for the newly formed Berliner Gramaphone Company. Johnson also continued experiments. He developed the first spring-wound motor for talking machines. He made the first successful governor to insure a constant turntable speed, and he improved the sound box. Above all, Johnson developed a new disc-type record which was superior to any record then on the market. It not only had fine articulation and accurate recording, but the added advantage of ample volume and a piloted sound box, as in the Berliner system. This success, however, came too late to prevent Berliner's company from collapsing, victim of a lost first round in the battle of the cylinder record versus the flat disc.

For a time the outlook also appeared uncertain for Johnson. But out of the wreckage, he succeeded in acquiring the Berliner patents to supplement his own and, in 1901, he founded the Victor Talking Machine Company. The name itself served notice on Berliner's enemies of the intentions of the new company. Under Johnson's leadership, the infant phonograph industry was transformed almost overnight into a business of dignity and stature. Courageously, decisively, the Victor Company moved ahead from its modest beginnings, accomplishing more in months than had been achieved in years.

Of immense value from the beginning was Johnson's promotion techniques which prompted him to acquire a trade-mark for Victor that has since achieved fame throughout most of the world—the little fox terrier Nipper listening to "His Master's Voice." Nipper was to become the symbol of quality and leadership in the phonograph and record field —a symbol of the greatest music and mascot of the greatest artists.

By the fall of 1901, Victor had won the first gold medal over all

*Soprano Lucrezia Bori and Tenor Giovanni Martinelli do some operatic singing into a 1915 recording machine as RCA Victor executive George Marek looks on. Violinist Gabriel Peyre is playing an ethroviolin, 1915 vintage.*

*Opera stars Enrico Caruso, tenor (standing), and Antonio Scotti, baritone, listening to the reproduction (left) by the talking machine of one of their famous duets —preserved for present and future generations of music lovers. In 1904, Caruso made his first Victor record in this country. In 1909, he drew up his own contract with Victor (below), a sketch of himself and a handwritten commitment.*

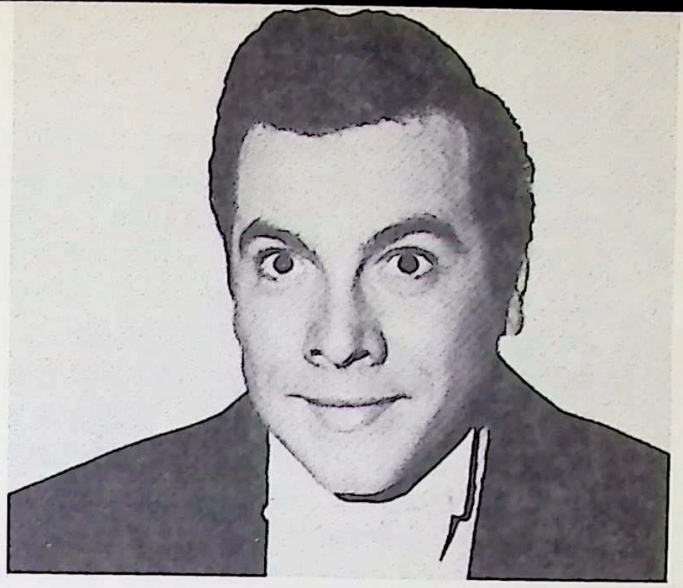


New York 15th Mar. 1909

I have renewed the agreement now existing between the Victor Talking Machine Company and myself for a further period of twenty-five years giving to this company the exclusive rights to make and sell records of my voice for the entire world.

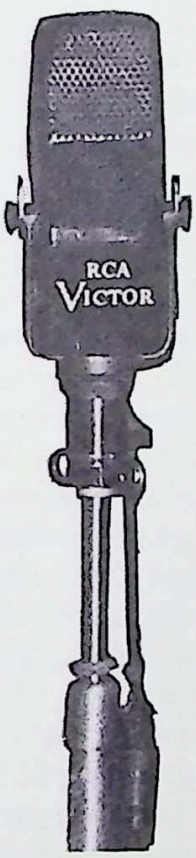
Enrico Caruso

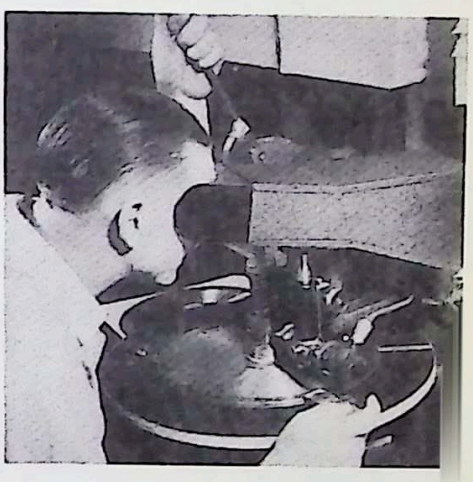
*An early recording session.*



*Tenor Mario Lanza*

*A recording operator inspecting record labels in the pressing room.*



*A record operator using a microscope to inspect a record.*

*Perry Como and Soprano Roberta Peters.*

*Perry Como listening to a playback.*

competitors at the Pan-American Exposition at Buffalo, New York. Before the year was out, it boasted an organization of ten thousand dealers. Acceptance by the world's largest musical houses enhanced prestige and commercial appeal. The revolutionary process of stamping duplicate records from electroplated master-discs was further developed, record quality was dramatically improved, and a new repertoire of recorded performances built up—all in an incredibly short period of time.

As early as March, 1902, the stage was set for the most significant recording event of all—the event that was to convince the public that the phonograph had changed from an inspired toy to a musical instrument of commanding greatness. Enrico Caruso was twenty-eight, and his soaring reputation, like that of Victor, was in its second year when equipment was set up to make the first "His Master's Voice" recordings in Italy, using the Victor master-disc method. So great was the excitement at La Scala Opera House in Milan that the recording staff became involved in a challenge to a duel when they first tried to hear Caruso. Fortunately, the tiff was settled amicably, and some days later, the tenor came to the studio and recorded ten arias in a single afternoon with "not one *stecca,* blemish or huskiness." All ten of the recordings were processed without one failure. All ten were issued. When one of Caruso's favorites reached New York and was played for Heinrich Conreid, General Manager of the Metropolitan Opera, he immediately cabled Caruso an offer of a contract. The association of Victor and the great artists was launched.

Led by Caruso, other operatic and concert stars followed into recording. Within a year, the list included such immortals as Calve, Kubelik, Scotti, Plancon, Lucia and Sousa. These magic names removed the last barriers between the great artists and the recording studio. In fact, it became an added mark of distinction for every artist who became associated with the Victor label. And for increasing thousands of musically minded Americans, the shadowy figures of the opera and concert stages became a warm, living reality.

In 1906, Victor announced an epoch-making advance—a phonograph instrument bearing its now world famous "Victrola" trade-mark, complete in a cabinet styled to harmonize with beautiful furniture in the home. The traditional phonograph horn disappeared into the cabinet, not only to enhance the appearance of the instrument, but to improve it acoustically as well. Up to then, the phonograph trade had been running riot in horns. Big horns, little horns, tin horns, brass horns, pink horns, blue horns—they came in all sizes and shades. Introduction of the "Victrola" phonograph had the immediate effect of opening a quality market, hitherto untouched by the industry. The new instrument's appeal was twofold—it was an attractive new piece of furniture for the parlor and an unparalleled source of musical reproduction. In entering the market, it was able to command a price as high as two hundred dollars—nearly ten times the amount asked for the early talking machines. The higher price range notwithstanding, dealers found their first timid orders snapped up by an eager public. Later, many of these same dealers were clamoring for carload shipments. For the "Victrola" sounded the death knell of the horn machine and the cylinder machine as well. Its popularity became universal.

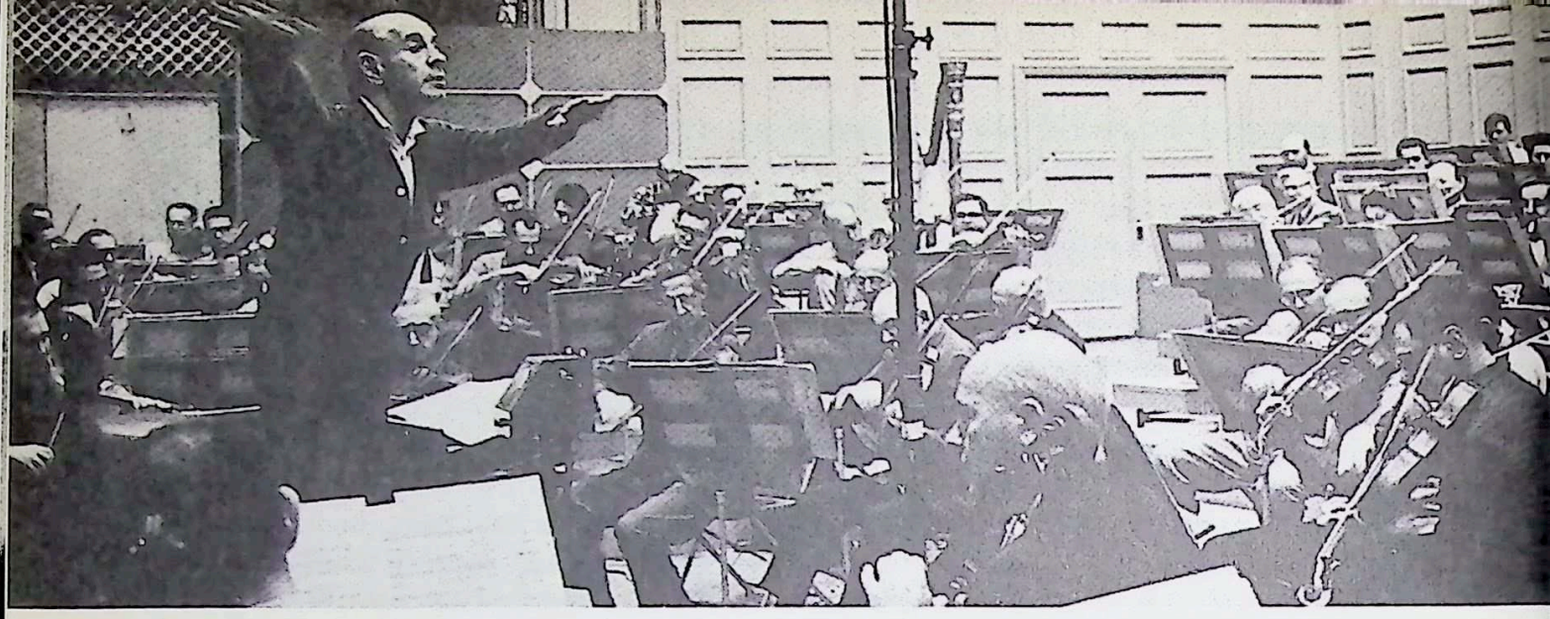
But it was about this time that science, through wireless, was broadcasting some feeble hints that some day it might enter the realm

of music. Pioneer experimenters were trying to make the wireless carry music and voices. As early as 1906, Fessenden, at Brant Rock, Massachusetts, played violin music over a radiophone. Then, in 1910, there was a prophetic event when Caruso, Destinn, and other artists of the Metropolitan Opera sang into a DeForest radiophone backstage at the opera house. It was becoming apparent that with the development of the electron tube, wireless was destined to handle symphonies and songs. But at that time it seemed a long way off.

There was a young man, David Sarnoff, a veteran in wireless, who had unusual vision and a great faith in science. In 1915, he caught a clear view of what was ahead and put it into a memorandum. Said Sarnoff: "I have in mind a plan of development which would make radio a household utility in the same sense as a piano or a phonograph. The idea is to bring music into the house by wireless. . . . For example, a radio telephone transmitter having a range of say twenty-five to fifty miles can be installed at a fixed point where instrumental or vocal music or both are produced. . . . The receiver can be designed in the form of a simple 'radio music box' and arranged for several different wave lengths, which should be changeable with the throwing of a single switch or pressing of a single button. . . . The same principle can be extended to numerous other fields—as for example—receiving lectures at home which can be made perfectly audible; also events of national importance can be simultaneously announced and received. This proposition would be especially interesting to farmers and others living in outlying districts removed from cities. By the purchase of a 'radio music box' they could enjoy concerts, lectures, music, recitals, etc., which may be going on in the nearest city within their radius. . . . Should this plan materialize, it would seem reasonable to expect sales of 1,000,000 'radio music boxes' within a period of three years." Demonstration of the practical value of the Sarnoff plan was delayed by World War I. However, in 1920, with the advent of public broadcasting, the "radio music box" became a reality. In 1922, RCA sold more than 100,000 "radio music boxes"; in 1923, 300,000, and in 1924, 600,000.

It was the constant aim of Victor to improve records and instruments in every way possible. Problems were many. But more important, leaders of the phonograph industry overlooked radio as an approaching competitor. The phonograph was a mechanical instrument. Radio was electronic. In the early days of the phonograph, all recording and reproducing employed acoustical methods. No thought was given to electronics. Sound waves set up by the recording artist caused the recording diaphragm to vibrate and, in turn, actuated the recording stylus. The artists worked under great handicaps. They spoke, sang or played into a large recording horn. While suitable for small groups, the horn was totally inadequate for full-size orchestras. Recording of more than twenty pieces presented a serious problem of grouping to bring all members of an orchestra within range of the horn. The usual solution was to pack them on tiered seats. The standard violin could not be used. Instead, a special recording violin was required—one with a Stroh horn that threw the sound in one direction.

The success of these early recording sessions was a tribute to the patience and skill of the artists, so great were the discomforts and confusion. With the musicians packed shoulder to shoulder, it was not uncommon for the violinist to run his bow into the neck or face of the



*Erich Leinsdorf conducts the Boston Symphony Orchestra.*

*Charles Munch conducts the Boston Symphony.*

*Arturo Toscanini conducts the NBC Symphony Orchestra.*

*Zubin Mehta conducts the Los Angeles Philharmonic.*

*Pierre Monteux conducts the Vienna Philharmonic Orchestra.*

*Leopold Stokowski conducts the RCA Victor Symphony Orchestra.*

*Tenor Jan Peerce recording sacred Hebrew songs for RCA Victor.*

*Contralto Marian Anderson (above left), Tenor Richard Tucker (above center), Soprano Patrice Munsel (above right), Soprano Roberta Peters (below left), Soprano Leontyne Price (below center), Soprano Lily Pons (below right).*

adjoining clarinetist, or for the trombonist to stab the back of the man in front of him, causing unhappy moments during a recording session. In 1925, all this confusion came to an end with one of the most significant developments in the history of the art—electrical recording. The microphone replaced the recording horn. The recording stylus was actuated not by sound waves but by electrical impulses. High and low frequencies never before heard on a record were put on wax. Next came the Orthophonic "Victrola" phonograph, capable of reproducing the wider range of frequencies, and within two weeks after Victor introduced it, orders totaling more than twenty million dollars at factory prices had poured into the home office. In the years after 1925, many changes came to the art and science of recording. Electrical reproduction replaced acoustical reproduction. Needles began to give way to the more efficient and durable jewel pickups. The automatic record changer was introduced. Improved records and instruments provided the consumer with more and more services.

Despite the technical advances and the introduction of repertoire that lifted the recording art to heretofore unattained heights and included the great symphonies and operas, as well as the best in popular music, public enthusiasm for records dwindled. The peak in record sales was reached in 1922, when the figure approached one hundred million. From then on, for the next ten years, the market fell away. The low coincided with the depths of the national depression, when sales were less than ten per cent of the top year.

Meanwhile, radio broadcasting soared in popularity. From a plaything of amateurs, radio developed during the 1920's into one of the most popular forms of home entertainment America had ever known. Sales of radio sets, which totaled 150,000 in 1922, had jumped nearly eight hundred per cent three years later and continued to climb during succeeding years. In the battle of radio vs. phonograph, radio had the decided advantage of providing a daily fare of entertainment without cost to the home. Moreover, radio broadcasting began attracting many of the great recording artists, particularly after a memorable night in January, 1925, when John McCormack, tenor, and Lucrezia Bori, soprano, both of the Metropolitan Opera and both Victor artists, made the first broadcast of their careers. That was recognition radio had long been awaiting while the scientists and engineers continually improved it to handle voices of distinction with entire fidelity. McCormack and Bori led the way to radio for many artists. No longer did great artists frown upon the microphone and broadcasting, or look upon it as a fad and a toy incapable of handling golden tones.

Radio Corporation of America, as the pioneer in this new art, in 1926 established the nation's first network—the National Broadcasting Company, dedicated to provide better programs of music and entertainment to the listening public. In fulfilling this aim, NBC contributed immeasurably to increasing and stimulating the American public's interest in classical as well as popular music. Among NBC's outstanding early musical programs were broadcasts of the Metropolitan Opera and the Walter Damrosch Music Appreciation Series. In addition, there have been the performances of many concert artists and the great symphony orchestras, especially the NBC Symphony Orchestra under the conductorship of Maestro Arturo Toscanini.

Foreseeing also the possibility of benefits to the public through a

combination of radio broadcasting and recorded music, General Sarnoff initiated the move in 1929 through which RCA acquired the Victor Talking Machine Company, together with all plants and facilities in Camden, New Jersey. Years later, recalling this period and its developments, he said: "When the 'radio music box' appeared in 1920 and the waves of radio began to wash upon the beach of entertainment, some believed that the phonograph would be washed up on the sands of time as a derelict. But there were those who thought differently. They looked upon radio as a fad and a passing fancy. They argued that radio could never compete with the phonograph in tonal quality or artistry. I remember when the Victor Talking Machine Company—and those who founded it did a great job in their day—could not understand how people would sit at home and listen to music that someone else selected for them to hear. They contended that music on the air would be infested with static. They rated the 'radio music box' and radio broadcasting as a mere toy. Result? Not many years passed before RCA acquired the Victor Talking Machine Company, the little terrier listening to 'His Master's Voice' changed its master, and a greater phonograph industry was built. Radio electronized the phonograph and greatly revived its popularity and the business. Although the Victor Talking Machine Company, passed into radio hands, more phonograph records are made and sold today than ever before. And the phonograph, through its magic association with electronics, has kept pace with progress. It has successfully met the challenges of radio and television. The instrument itself is not only improved, but electronics has revolutionized the techniques of recording so that there is no comparison between a record of the 1925 vintage and those of 1967."

With the extension and improvement of home entertainment as a goal, RCA Victor brought into its operations scientific and engineering techniques unmatched in the industry. In addition, this combination of the radio and phonograph arts had the foremost talent ready to cooperate in its efforts. Paradoxically, it was radio—recording's stiffest competitor—which not only became the star salesman and showcase of records but revitalized the phonograph industry. Radio, together with automatic coin machines, brought popular music to people in all walks of life and rapidly extended markets across the land.

In 1939, RCA Victor initiated a comprehensive study of the record and phonograph situation, while continuing its leadership in the production and sale of records and instruments. Less than ten years later, despite delays necessitated by World War II, this study known as *Project X*, resulted in a new phonograph system. The goal of RCA Victor engineers in this project was the development of a music reproducing system that would eliminate the shortcomings of conventional phonograph systems and incorporate the advantages made possible by the increased knowledge of electronics, recording techniques, and instrument engineering. This goal was achieved by the RCA Victor 45-rpm system, introduced to the public in 1949. The "45" comprised an array of the major firsts—first record and changer literally made for each other; first record of distortion-free performance over one hundred per cent of its playing surface; first record designed in a single size to play all classifications of music; new unbreakable, lightweight record of smaller size to solve home storage problems; speediest record changer, half the size and requiring twenty-five per cent fewer parts than conventional models.

*The three great musical geniuses of our time, Violinist Jascha Heifetz (left), Pianist Artur Rubinstein and Cellist Gregor Piatigorsky, have recorded their music for RCA Victor for many years and have provided pleasure and inspiration for millions of families the world over. Their recorded music will live on forever for all to enjoy.*

*Musicians of the 15th century.*

The RCA Victor "45" system has made history. Millions of these instruments now are in American homes and record sales have attained a going rate far beyond the most optimistic estimates of manufacturers and dealers. Together with the 33⅓-rpm long-play records, these discs represent an outstanding triumph of science and art. RCA Victor's 33⅓-rpm records, which were introduced in 1950, won almost immediate acclaim from that portion of the public desiring to play certain classical selections on long-play discs. These records, produced on non-breakable vinyl plastic, employ an exclusive RCA Victor processing method which insures high quality and tonal fidelity.

*Dynagroove* sound has been called "the most significant advance in recording art since the long-playing record." For recordings, it means true brilliance at all volume levels in either stereo or monoaural. It means "presence" that "puts you right in the room with the performer." It means greater clarity, improved fidelity to the original sound values with an absence of distortion. And it means a new kind of listening pleasure for those who hear the recording. The *Dynagroove* recording process employs special techniques at various stages in the making of a record, from the precise "tuning" of the studio to the exacting transfer of mastered tape to lacquer.

The research program that resulted in *Dynagroove* began more than five years ago at the RCA Victor studios in New York and at the David Sarnoff Research Center in Princeton, New Jersey. New studio "tuning" methods were perfected, and super-sensitive microphones were utilized. High-powered new electronic equipment was developed. Extensive experiments with tape speeds were conducted and remarkable new methods of transfer were developed. One final phase in perfecting this new process was the development of an Electronic Dynamic Styli Correlator—a kind of computer that revolutionizes the method of cutting the grooves in the master disc. This astonishing computer predicts the many tracking problems the phonograph needle will encounter as it moves through the record grooves. And with this advance knowledge, the cutting stylus is directed along a course on the master that eliminates unnecessary turns, zig-zags and shocks inherent in the conventional groove. For the first time, the groove now moves the needle in a true dynamic track.

Even back in those autumn days of 1877, when Edison demonstrated his first phonograph, the news had an impact far surpassing any previous scientific innovation. Thousands of excited citizens, brought in special trains from New York, crowded into the "wizard's" laboratory at Menlo Park, New Jersey, for a peek at the talking machine. Newspapers of the time ran bold, black headlines about the event, and predicted editorially that the phonograph would change the world's way of life. Rutherford Hayes, President of the United States, called Edison to the White House in the heat of excitement, admitted the inventor shortly before midnight, and stayed up for hours playing with the machine.

This flurry of wonder subsided once the world's initial curiosity was spent. But it was destined for revival soon after the turn of the century, when Victor recordings of the musical great of that day suddenly transformed the phonograph from a toy into an instrument of home entertainment and cultural advancement of mounting popularity as the decades passed. Here, at last, was a medium through which musical understanding and appreciation could be spread and developed among children, as well as grownups.

Music education in the early 1900's consisted almost exclusively of class singing, or as choral activity in high schools and colleges. If children in the elementary grades learned anything about music in those days it was in spite of what was taught. There were many music educators of the period who fought for more and better music in schools, but it took the vision and energy of Dr. Frances Elliot Clark to recognize that the phonograph record was the device which alone could provide the means of accomplishing what then were merely idealistic dreams. Dr. Clark was music supervisor in Milwaukee when she first experimented with records in the teaching of music. So successful was she, and so convinced of the value of records, that she gave up teaching to accept an offer by the Victor Talking Machine Company in April, 1911, to become Director of its newly formed Educational Department.

From that date on, music became a living force in American education. Dr. Clark employed dozens of former music educators who toured the country demonstrating the new teaching and new aid and implementing music in the curriculum as it had never been done before. Dr. Clark was responsible for the first release of records made especially to fit school needs. In increasing quantities, year after year, came specialized records in the fields of singing, rhythmic activities, folk songs and dances, listening, and records for many other special school activities.

Today music educators everywhere acknowledge the tremendous value of the phonograph record in their over-all music program. Without it, their efforts and work would be as incidental as it was in 1900. For in those days, music consisted primarily of a "singing class," perhaps once a week. The school band or orchestra was practically unknown except in a few major cities. Today the school music program has a place of prime importance even in the one- or two-room rural school, thanks to records. Today's student not only learns to sing, but also develops poise and grace through rhythmic music from phonograph records. He listens to music for the pleasure it affords. He learns to identify instruments which leads eventually to his participation in the school band or orchestra. His physical education is enhanced by the rhythms of records. He learns of other lands, peoples, and dances, through folk song and dance records.

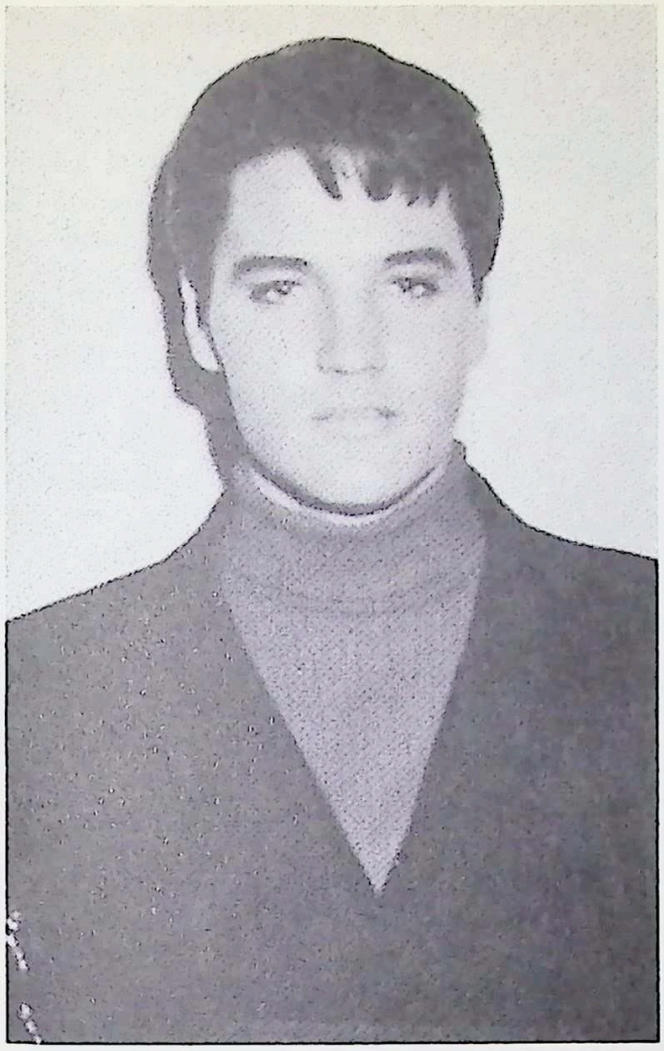
The eagerness with which schools welcomed the phonograph record is attested by the fact that in 1911 there were only a few schools using records, mostly in Milwaukee. By mid 1916, only five years later, more than 4000 towns and cities were purchasing hundreds of thousands of Victor records yearly. The piano, which for many decades had been the standard purveyor of all forms of music, had been outclassed, as wonderful as it was, as an interpreter of music. The talking machine had become the "Open Sesame" to the great world of tonal beauty.

In that first year, Dr. Clark utilized existing Red Seal records by such immortal artists as Melba, Caruso, Kreisler, Schumann-Heink, Tetrazzini, Elman, Sembrich and many others. But this was only a good expediency until educational records could be specifically produced and recorded to meet the needs of children in musical development. Later, Victor records were issued not only for singing, but for folk dancing, marching, physical education, geography, penmanship, and other applications for correlation with school work.

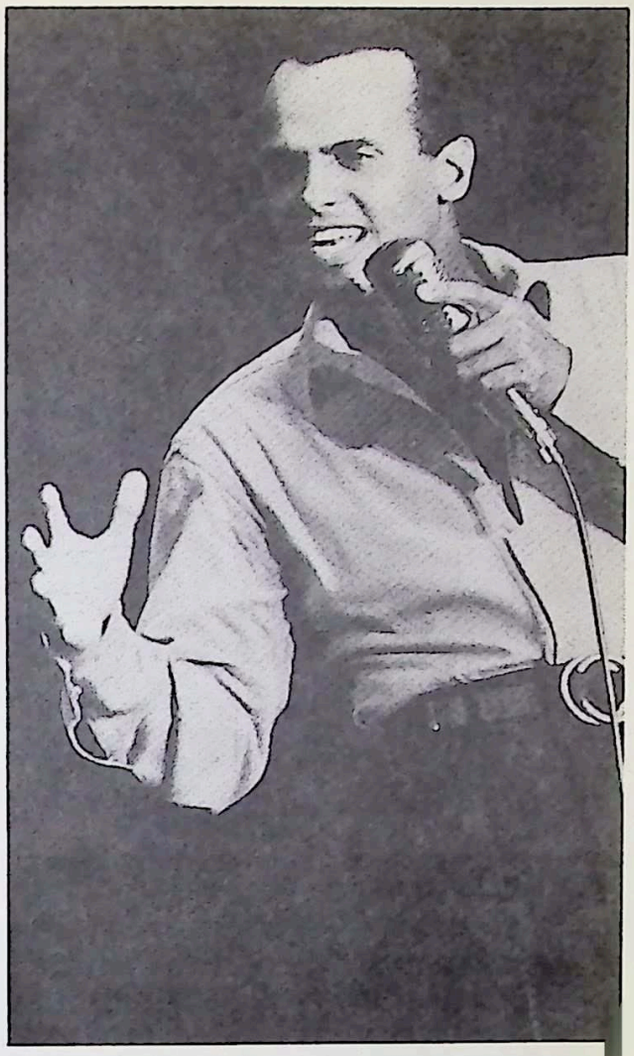
The influence over the years of this work resulted in two great effects, one immediate and one far-reaching. The immediate effect was to practically revolutionize the school music program. For the first time,

*Vocalist Tony Martin (left), Conductor Arthur Fiedler of the Boston Pops Orchestra, and Soprano Kathryn Grayson.*

*Clarinetist Benny Goodman (left), Trumpeter Al Hirt (above), Pianist-Conductor Andre Previn (below left), Pianist Peter Nero (below right).*



*Elvis Presley, vocalist*



*Harry Belafonte, vocalist*

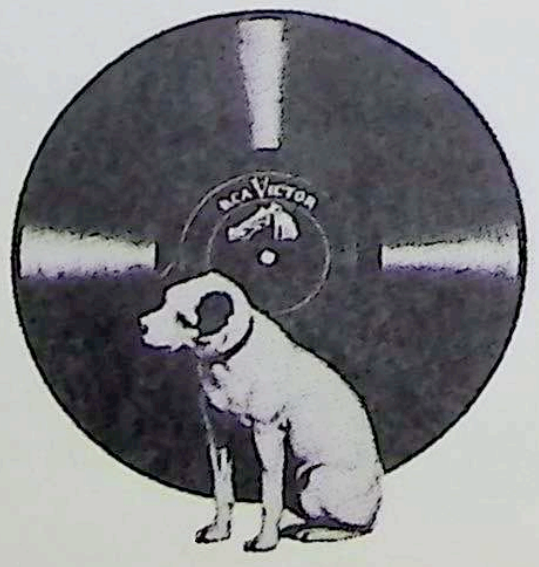
*Lena Horne, vocalist*

the truly great music of the world was brought into the active life of millions of students. They were exposed to its beauties and learned to love it. Their understanding of other peoples and nations increased as they learned of foreign music, for music is at the heart of the culture of every country. The far-reaching effect was shown in the rapid growth of musical appreciation in America from that time on, and the growth of the record business itself. As children learned more of music, this interest was absorbed by the parents who themselves began to delve into the treasure house of music. The total effect was a resurgence, or perhaps even a birth, of music throughout the country. As more and more students and parents grew to love music, through exposure to it, so did the phonograph and record business itself grow.

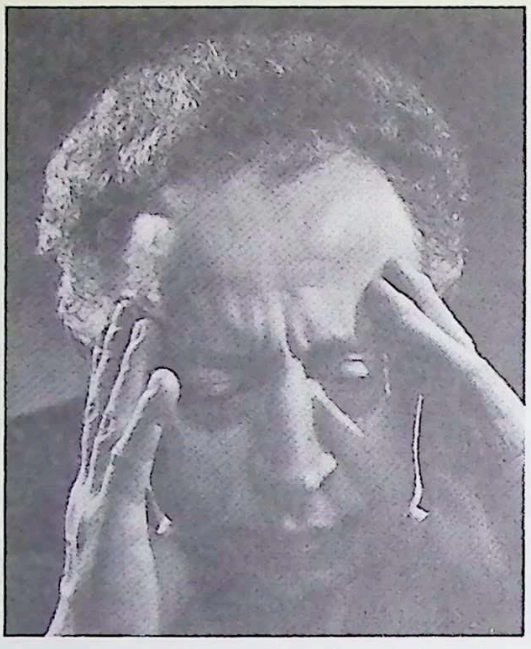
For many years, the Victor record and famous "Morning Glory" horn of the Victor phonograph were synonymous with the growth of music in schools. This was because the end product, literally hundreds of specialized educational records, were prepared to meet the needs of schools as carefully as any textbook. RCA Victor carries on the tradition and leadership in supplying schools with the records they need. Today, thousands of educational records are available not only in the field of music, but also in newer fields—foreign langauge, social studies, speech and drama, sacred song and story, and for many other areas of the school curriculum.

One of the greatest joys of families owning records is their freedom in playing the musical selections of their choice. Any member of the household can be concert manager, program arranger, record selector. Adults and children alike can share, individually or collectively, in the delights of the recordings. The element of time, generally so important in listening habits, takes on a new dimension when records start spinning. For any time available and desirable can be the appropriate time to hear favorite recordings. It's like having a fairy godmother with the ability to invite into the home the greatest artists of the past and present, to place at beck and call singers and instrumentalists not only of bygone years, but of today's and tomorrow's radio, television and Broadway shows.

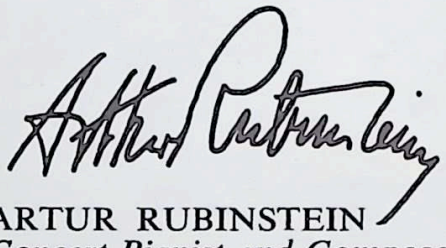
As the leader in the phonograph and record field, RCA Victor has contributed outstandingly to all phases of musical expression. It has made available to the public "Music America Loves Best" and has applied the greatest scientific advances to lift the recording art to heights of increasing enjoyment. Today's RCA Victor record catalogs bear eloquent testimony to the progress achieved in satisfying the musical desires of millions of Americans. By careful selection from these outstanding lists, it is possible to create a home library of records that will be the basis for extending the musical pleasures of the entire family.



*A rare photograph of four world-renowned musical geniuses of our time as they appeared together in the early days of NBC radio. (Left to right) Fritz Kreisler, the concert violinist and composer of many violin pieces, string quartets and operettas. Harold Bauer (standing), piano virtuoso, especially known as an interpreter of Brahms, Schumann and Franck. Walter Damrosch (seated), music educator and musical conductor of the New York Symphony Orchestra and founder and conductor of the NBC Orchestra Radio Concerts and NBC Music Appreciation Hour for public schools and colleges. Pablo Casals, cellist, conductor and composer. When Casals appeared on the NBC-Television Wisdom Series, he spoke of his life and work and discussed his experiences as a performing artist, conductor, and leading interpreter of the music of Bach. Casals has composed oratorios, masses, string quartets, instrumental pieces, songs, and orchestral works. Fritz Kreisler called him "the best musician who draws a bow, and King of all String Players." Casals, through a series of innovations, has reshaped the technique of cello-playing.*



One cannot contemplate without astonishment and admiration the many great things David Sarnoff has accomplished in his long and fruitful life. He achieved greatly and nobly because he felt greatly and nobly. His achievements in the field of classical recordings, and in broadcasting great music through radio and television, are unequalled by any man of his time. He did not try to meet the musical taste of the public, he elevated it. He invested music with an almost religious sanctity. He has been a powerful influence for good, and his place in history is already assured. But one thing more we are certain of, that he fills a large place in the hearts of many lovers of music the world over.



ARTUR RUBINSTEIN
*Concert Pianist and Composer*

*Artur Rubinstein, the world's most popular piano virtuoso of our time and an eminent recipient of the Wisdom Award of Honor, is shown reading the special edition of Wisdom Magazine which was devoted to his wisdom and published in tribute to his distinguished achievements in music. An RCA-Victor recording artist whose piano records have sold into the millions, he continues to breathe new vitality into the works of the great masters after seventy years of performing before the public. His talent and love for music are equaled only by his talent and love for life.*

*In 1948, Sarnoff spoke at the first nation-wide telecast of the NBC Symphony Orchestra conducted by Arturo Toscanini.*

# THE WISDOM OF SARNOFF ON *Music*

*Alfred Wallenstein conducting the RCA Victor Symphony Orchestra.*

My love affair with music began at an early stage in my life. At the age of ten, I was a choirboy in a synagogue on the East Side of New York. Fortunately, at least for me, my soprano voice left me several years after I began. And then I became a businessman.

I sold newspapers on the East Side and learned that my passion to hear the great singers at the Metropolitan Opera required fifty cents if I was to get a standee's place in the gallery. And so I cheerfully sold one hundred newspapers in a day to earn the fifty cents which got me to the gallery and enabled me to hear the golden voice of Caruso. Some years later, I jumped from the gallery to the Director's Box where I had a seat for twenty-six years as I served on the Board of the Metropolitan for that period. But I will confess that the thrills I felt in the gallery were never exceeded by those in the Director's Box.

The greatest thrill of all for me, perhaps, was when I was able finally to persuade Maestro Gatti-Casazza to permit broadcasting from the stage of the Metropolitan Opera over the NBC network to all the people of our nation equipped with radio sets. That was thirty-five years ago, and I am happy to say that it is continuing up to today, and that the audience is now counted in the millions.

It was my great love for music and my desire to share it with all who could hear it that stimulated the efforts to bring Maestro Toscanini from retirement in his native Italy to the airwaves of our country. And he came. We organized the NBC Symphony Orchestra for him—the first symphony orchestra created exclusively for radio broadcasting. For seventeen years, the incomparable Maestro directed the concerts that made history in the world of music.

The phonograph is wedded to radio in a happy marriage, both living in the same cabinet and both producing the finest music that science and the arts can provide at this time. And what of the contributions of radio and science to the art of recording and reproducing music? Think of all the inventions that you hear about—the electronic microphone, the new systems of recordings, hi-fi, orthophonic, stereophonic, transistors, new forms of loud-speakers, and many other inventions, all of them contributing to the faithful reproduction of music.

Phonograph music today is a joy compared to the time before the electron entered the field, the time when we heard blasts of noise, unfaithful reproduction, unwelcome scratching and ticking. Apart from technological and artistic advances, the phonograph and record industry today is many times greater than it was before the advent of radio.

We now live in a time when the march of science is so rapid and the changes—technological and scientific—are so numerous and come with

such speed that man is hardly able to keep pace with them. But let us not despair. For whatever the machine may do, whatever radio, or television, or communications, or computers can provide, they can never replace the importance and the significance and the dignity of man himself.

I have lived a long time around machines, and I have studied a good deal about their operations and about their results. But as I add up and review the inventory of life, I find that what I have learned, or what little I have been able to assimilate, has come from men not from machines. It was my great fortune to know intimately most of the outstanding scientists and engineers of the radio and allied industries. I have also known most of the great artists, composers, and conductors of the past half century or so. And from each of them, I have learned something of importance.

My intimate friendship with Maestro Toscanini for seventeen years taught me a lot. I can confess that I played an awful lot of hooky during the seventeen years that he headed the NBC Symphony Orchestra. When the Maestro conducted the orchestra, I sneaked away from my office and played hooky in a private little listening studio in the NBC. To watch and listen to the incomparable Toscanini rehearse an orchestra was even a greater thrill than to hear him perform in a concert hall. And from him I learned a good deal about business. No one has ever said that Maestro Toscanini was a businessman, but I watched this man's relentless pursuit of perfection, his pursuit of excellence. He never was satisfied until he got the result that to him seemed to be at least as near perfection as human effort could achieve. I saw him extract from men much more than these men themselves knew they had—more than they knew they could give. He taught me how to extract from one's associates the best of which they are capable, not merely the best of which they think they are capable. That is a lesson that is as applicable in human relations and in business as it is in music.

Music has been a large part of my life, and I hope it will continue to be. It was Longfellow who said that music is the universal language of man. Music, like language, is peculiarly the creation of man. And it seems to me that the greatest object of music is to touch the heart of man and to wash away from the soul the dust of our daily life.

Science has a natural affinity with music. The phonograph is a perfect illustration of the strong relationship that exists between the arts and science. Music is a wonderland of the arts in which scientists find new challenges for invention.

The advances in scientific techniques and the development of new instruments have given tonal perfection to recordings of the masterpieces, presenting the creations as the composers intented. Music long chal-

lenged man to record and reproduce it with fidelity—a goal not easily accomplished.

Heifetz, Rubinstein and all the other great artists of this age now can record their songs and music and have it played back immediately. They have the opportunity to study the performance and decide whether their renditions are true to their talents and performed in the manner that the composer would want them played or sung. Beethoven, Chopin, Wagner, Mozart and Bach had no such facilities of science at their command. They could only write the music for posterity and hope that it would be interpreted and rendered in the spirit of their creation. The masters probably never gave thought to the fact that science might some day play such an important role in music. Yet it was electricity that first gave the phonograph new stature as a musical instrument by replacing its hand-wound spring with an electric motor.

Surely the influence of radio and electronics never entered the minds of the phonograph pioneers, for wireless was not invented until 1895, and the electron waited until 1896 for discovery. Many years passed before those two new forces developed to a point where their relationship to the phonograph was realized.

In 1916 I first outlined plans for a "radio music box that would make radio a household utility in the same sense as the piano or phonograph." Finally, in 1920, with the advent of broadcasting, "radio music boxes" began to appear. They became so popular with the public that predictions were heard that the phonograph was destined for extinction. Pioneers of the phonograph, however, thought differently. They looked upon radio broadcasting as a fad and a passing fancy, and they called the "radio music box" a toy. They argued that radio could never compete with the phonograph in tonal quality and artistry—many artists of that day agreed. Time and events have proven that they were mistaken.

As radio and electronics advanced, new techniques of recording were achieved, and it became apparent that radio could handle the voices of distinction and the symphonic masterpieces. Millions of people throughout the world in our generation have seen this come to pass. Even the great voices of the past, which were recorded through relatively crude acoustic horns, now feel the magic of electronics. The famous voices of days gone by have been revitalized and rerecorded electronically to comprise "A Treasury of Immortal Performances."

The little terrier listening to "His Master's Voice" now hears it with entire fidelity. Caruso sings anew from the revolving stage made possible by new plastic discs created by advances in the science of chemistry. Magnificent music recorded by Maestro Arturo Toscanini directing the NBC Symphony Orchestra, and famous singers as well as musicians of this age entertain the vast audience of the present while their art is

preserved faithfully for generations to come.

The modern "Victrola" phonograph is evidence that there is nothing more permanent than change, and in this case, the changes created by science have opened new vistas to the wonderland of music.

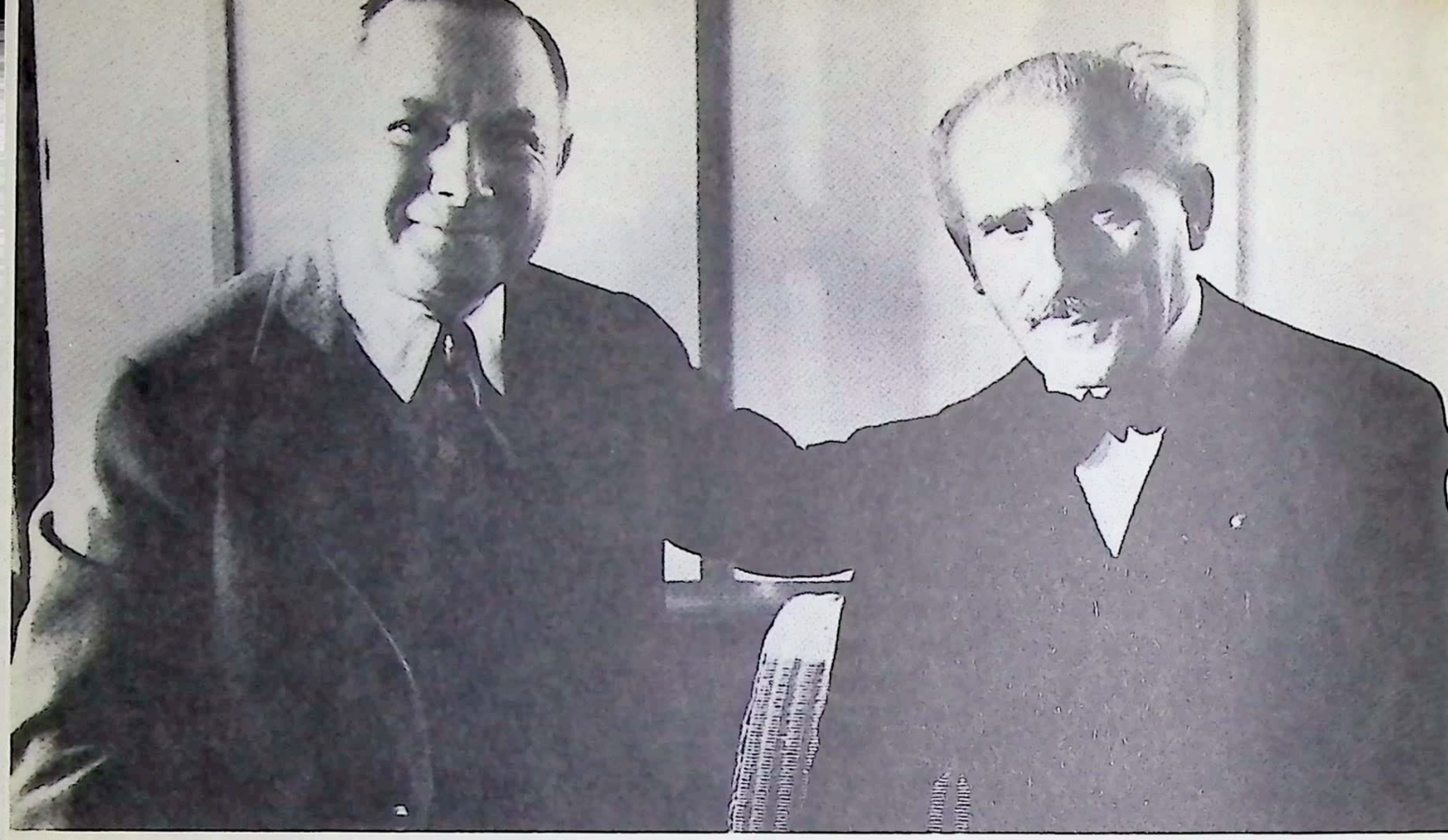
In the realm of the arts, the creative composer and skilled artist will remain the master. In the long run, synthetic musicmakers must stimulate mass appreciation and appetites for more music, which in turn will make their contributions not less but more in demand.

Music has been a vital part of my private life. Even before I entered the radio field—at the ripe old age of fifteen and in the important role of office boy—I had sung in a synagogue choir. Perhaps that is why, for me, the best music has always had about it an aura of the sacred. Deepening adolescence cracked my fine soprano voice, and that was the end of my personal career as a musician. But my love of music remained a constant source of joy and consolation. And my appreciation of musicians, I might as well confess, has been tinged with envy.

*Musical instruments of ancient history.*

General David Sarnoff has given his whole life, through his research laboratories, to communications. In my opinion, it is the solution for life on this earth. I conduct in Poland, Czechoslovakia, Yugoslavia, East Germany, West Germany, among many other countries, of course, and I find that in all those countries the people are just like us; there is no difference. So through communications, I am hoping that the world can become one great family, that we can meet the peoples of all countries, see that they are like us—men, women and children, and families—and that we will not kill each other, but we will shake hands, enjoy being together, understand each other. And all this can be done through the greater development of communications, for which General Sarnoff has given his whole life.

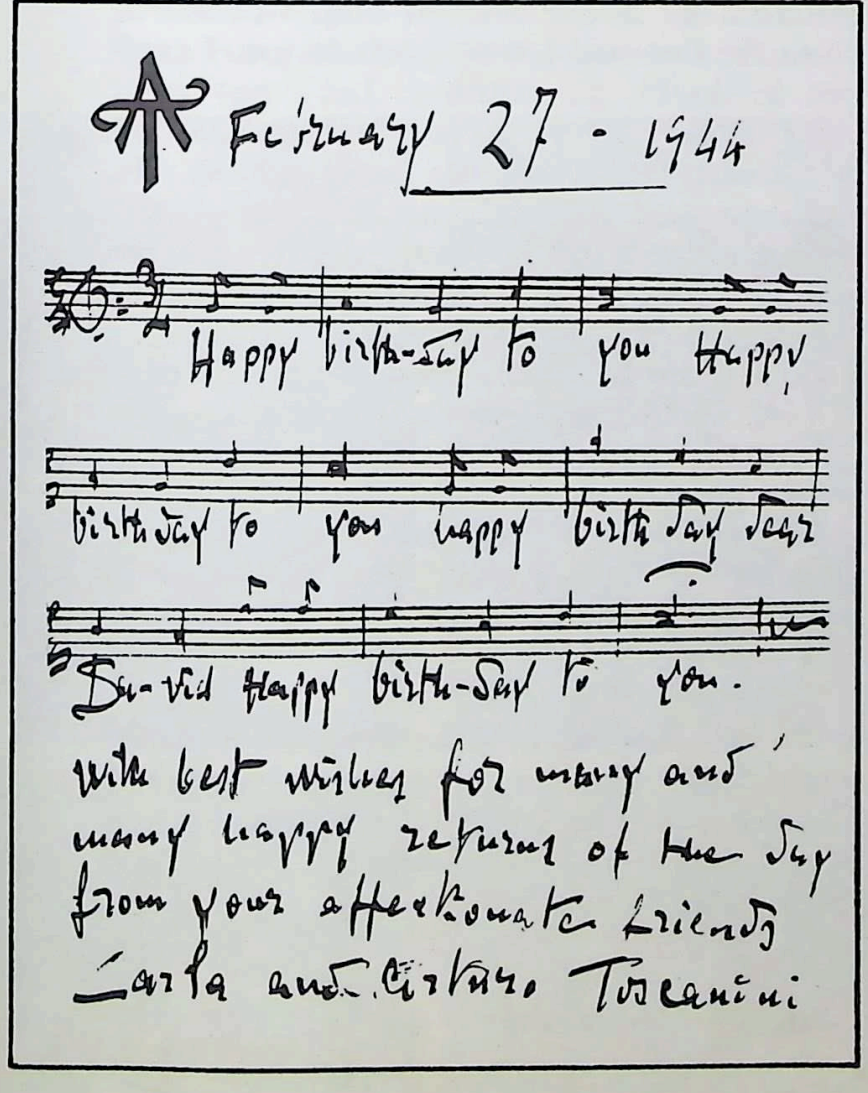
LEOPOLD STOKOWSKI
*Symphony Orchestra Conductor*



*David Sarnoff and the incomparable conductor, Arturo Toscanini (right), for whom General Sarnoff founded and created the NBC Symphony Orchestra. The first Toscanini concert with the NBC Symphony took place in 1937. Except for one year when he was on leave (1941-42) and conducted five United States Treasury concerts for bond sales, Toscanini was the regular conductor of the orchestra for 17 years. His broadcast concerts with this group, according to music critics, were among the most exciting musical events in America. In 1950, at the age of 83, he took the NBC Symphony on a coast-to-coast tour of the United States, covering 20 cities in personal appearances. After his retirement from his 17-year association with NBC, Toscanini left a rich musical heritage in the form of symphonic and operatic recordings made over 33 years for RCA Victor Records.*

# THE WISDOM OF SARNOFF ON *Toscanini*

*Sarnoff and Toscanini were close personal friends. Among General Sarnoff's prized mementos of his friendship with the Maestro is Toscanini's "musical birthday card" (below) written to Sarnoff in 1944.*




*In 1966, David Sarnoff was honored with the Concert Artists Guild Award for his "invaluable contributions to the musical heritage of the world." More people have been introduced to fine music through General Sarnoff's initiative than as the result of any other single influence. His contributions go back to the early years of radio with the establishment of the weekly "Music Appreciation Hour." He arranged for the first direct broadcasting of grand opera from the Metropolitan Opera House in New York, establishing a musical tradition that has continued to the present time. NBC, under his guidance, introduced the American listening public to the great orchestras of the world.*

One of my great joys in life has been my love for music. And so I found an affinity and affection for the late Maestro Toscanini which went far beyond the normal business relationships of an executive and a conductor of an orchestra. I really revered, as well as respected, the old man because to me he was one of the greatest men that I have known in my life.

I remember, that when Toscanini's NBC orchestra was formed for the first time, we had all first chair men—the top fellows in each section. I had conductor Rodzinski and Samuel Chotzinoff pick these first chair men, and out of that selection came the NBC Symphony Orchestra of a hundred.

Everybody in the orchestra was okay except the first clarinetist—a very difficult section to fill. I had issued an order that they were not to take men from the Philharmonic, the Philadelphia or other regular orchestras. A young man about twenty-eight years of age was selected to be our first clarinetist. He seemed to be all right, but he was not quite up to the standards that the Maestro would expect.

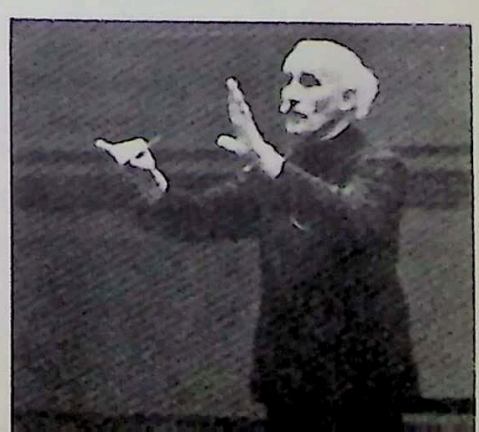
On the morning when Chotzinoff, John Royal and I went to greet the Maestro on the arrival of his ship from Italy, we were arguing among ourselves about the clarinetist. Shall we tell the Maestro? Maybe if we tell him, we will get off easier. If we don't tell him and he discovers it, then he might not want to conduct, and it would be too late to get another clarinetist. Well, Royal thought that we ought not tell him. Chotzinoff thought that we ought to tell him. So the decision was left to me. I said, "Well I have one rule—when in doubt, do nothing. Let's see what happens. Let's not make up our minds at this stage." So we boarded the ship and the Maestro was all ready for us. Before we could say five words, he said: "NBC Orchestra very good. First clarinetist not so good." I thought to myself how in heaven's name did he know about that. He was just arriving from Milano, Italy. He hadn't been here. He hadn't seen any of the musicians. He hadn't heard any of them. Immediately, I suspected that Rodzinski had written the Maestro and told him about it so he wouldn't find fault with him. Well, I was wrong. Chotzinoff said, "Maestro, how do you know about the first clarinetist?" And Toscanini replied, "Oh, I have been listening on short wave in Milano to your few preliminary concerts." He had been able—4000 miles away—to pick out the playing of the first clarinetist! "Well," we said, "you're quite right, Maestro." Then we started making speeches. He didn't say anything.

It was a great risk I took with the Maestro, because the original contract provided that if he came here and didn't like the orchestra, there wasn't going to be any orchestra, or any music, or any Maestro. He wasn't going to play. So you can imagine how anxious I was on the first day he arrived to listen to the orchestra which we had assembled for him.

I was with Toscanini on his arrival in Studio 8H for the first time. And

I was apprehensive. The orchestra was on stage and Rodzinski was conducting. Maestro Toscanini listened. After it was all over, he said, "I want to see the first clarinetist." The young man was called up and the Maestro put his hand on his shoulder and said: "You are a very good clarinetist. You play well, but there are some things you do, I don't like. Now you come with me." So he took this young man into his private room and at once began to coach him. And this clarinetist remained with the NBC Orchestra for many years. He became one of the leading first clarinetists in this country. Maestro Toscanini, of course, happened to be in that mood. He might have cut the clarinetist's throat, too, if he happened to be in another mood. But such was the greatness of the man that he was able, when he listened to that musician, to discover that he had the capacity, but wasn't expressing it because he hadn't been taught properly how to do it. He knew that he could teach him, and he did. He made a leading clarinetist out of this fellow who was about to be chucked out. In that example there is a moral lesson for all of us.

As I watched the Maestro rehearse his orchestra this is what I learned: He was a hard taskmaster with himself. But he demanded more from himself than he demanded from anyone else. He was a perfectionist in his line. He told me that he never accepted from a musician what the player said was the best he could do. "Nobody," Toscanini said, "knows what is the best he can do." He said that these fellows could play a lot better than they did, but they didn't know it. Therefore, he was continuously demanding from each player the maximum which music, and his understanding of music, demanded—not the maximum which the player thought he could give. He maintained that man himself is the least competent to judge the maximum capacity he possesses.



# THE WISDOM OF SARNOFF ON *Theatre*

There are two factors that play major roles in shaping any man's beliefs. First, there are the precepts developed by our spiritual and educational leaders. Second, there are the means by which these precepts are communicated to men and women everywhere. For centuries, one of the most effective art forms in the dissemination of ideas has been the theatre. From the earliest times, man has acquired many of his beliefs from dramatic presentations. He went to be entertained, but at the same time, he learned.

The theatre has its roots deep in religion. As in other art forms, the early development of the modern theatre, and much of its inspiration, came from the church. Any student of English drama knows that the modern theatre had its origin in the religious pageants, or "morality plays" of the Middle Ages. I believe that the first recorded dramatic performance in England was an Easter pageant, which took the form of responsive reading. But I think even more important than the historical association of the church with the theatre is this basic common denominator—both are essentially concerned with broadcasting an idea. I must confess that in many cases, the ideas expounded by particular theatrical performances have little, if any, spiritual value. But there is a basic kinship between the church as the expounder of the truth, and the theatre which seeks to reflect the truth.

The effectiveness of the theatre in bringing to men things of the mind and the spirit, has been limited, down through the years, by a number of factors. It has been hampered at times by the lack of vision of some of the people in charge of theatrical productions. They have apparently felt that the sole purpose of the theatre was to entertain. They failed to see, that while entertaining, they also had the opportunity to inform. Here, as with the products of science, we are concerned with the use to which the medium is put. Like radio and television, the theatre has potentialities for good and for bad. We have seen in totalitarian countries how it can be used as an instrument of propaganda to misinform and mislead the public. On the other hand, we have seen outstanding examples of how it can lead the public toward the truth.

One of the limitations upon the theatre's service to mankind has been physical. The facilities for doing an effective mass job have not been available. There were not enough people with enough money to stage enough shows. There were not enough theatres to hold all the people who wanted to see these shows. And the presentations themselves have suffered from the fact that the dramatist had to confine the action within the three walls of the stage. Ever since the dawn of the theatre, people interested in it have been trying to solve these problems.

Science has overcome the limitations of the theatre. The development of television has given the theatre a stage as big as the world and a theatre that now holds an audience of many millions of American families. Moreover, the best performances can reach millions of people

to whom the theatre is not available.

Television opens the door to entirely new types of theatrical performances. It offers new horizons to the dramatist. No longer need he be bounded by the physical limitations of the theatre. He has a new and a wide audience to which he can address himself in new ways. The dramatic unities of "Time and Place" specified by Aristotle no longer prevail. The identification of the play with the individual in his home provides a type of audience participation that Shakespeare possibly imagined when he said: "All the world's a stage and all the men and women merely players." And now we have color, so that all the beauty of set and costume can be enjoyed by television's vast audience.

We can see the great new scope that television offers the theatre. But this whole relationship is not one-sided by any means. For while television offers the theatre great new opportunities, the theatre, in turn, can make great contributions to the progress of television. One of these contributions can be in the field of education through television. And, of course, when we speak of education, we mean the teachings of the church as well as those of the school. Religion certainly has a legitimate place on the airwaves as well as on the stage. The church was among the first to advance the use of radio broadcasting for spreading its religious services to a nation-wide audience. These programs have brought inspiration, comfort and solace to countless millions of people—especially to those who for physical reasons beyond their control are unable to go to church. We look forward to the effective use of television as a means of spiritual education.

The theatre can help television to realize its great potentialities as an educational force. Anyone who has been in a church knows that there is more to a sermon than the simple presentation of spiritual truths. Anyone who has ever been in a classroom knows that there is more to education than the simple recitation of a series of facts. They must be presented in interesting form. That is why students enjoy one teacher, or one class, and do not enjoy another. And it is a fact that students learn best when their interest is captured and held.

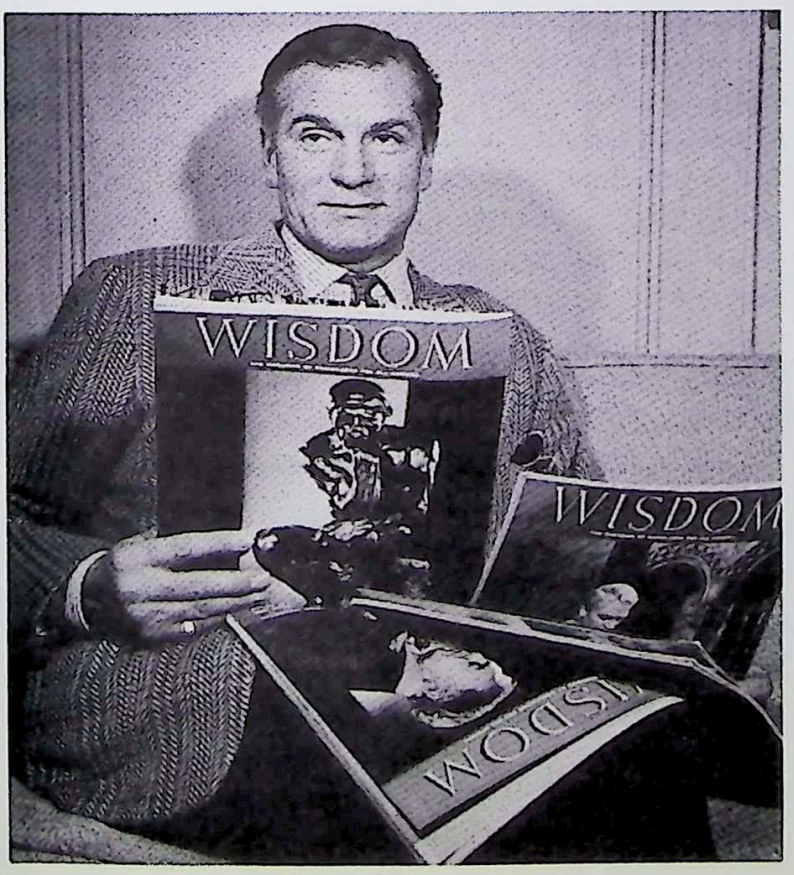
We will not be utilizing the educational possibilities of television to the maximum if we do no more than make television time available to educators. The greatest collection of truths miss their target if they are not heard or seen. This is particularly true in the field of adult education. In the classroom, the students at least have to sit there, regardless of how dry the teacher's lecture may be. But no one in his home has to listen to the radio or watch anything on television. He can turn to another station, or turn off his set completely, the minute it fails to hold his interest. I offer radio as a parallel. When radio broadcasting began, almost anyone willing to talk could get on the air. We started off with people making speeches. Then we found that the audience for these speeches was limited. So, we tried to develop new techniques—

forums, debates, interviews—all designed to make the subject interesting as well as informative. This greatly increased the radio audience.

Scientific programs on television have departed from the straight lecture technique. They are built around demonstration and action, by shifting the camera from one scene to another. The scripts for educational presentations on television should be just as carefully prepared, with the interest of the audience in mind, as the script for any dramatic presentation on the stage of a theatre.

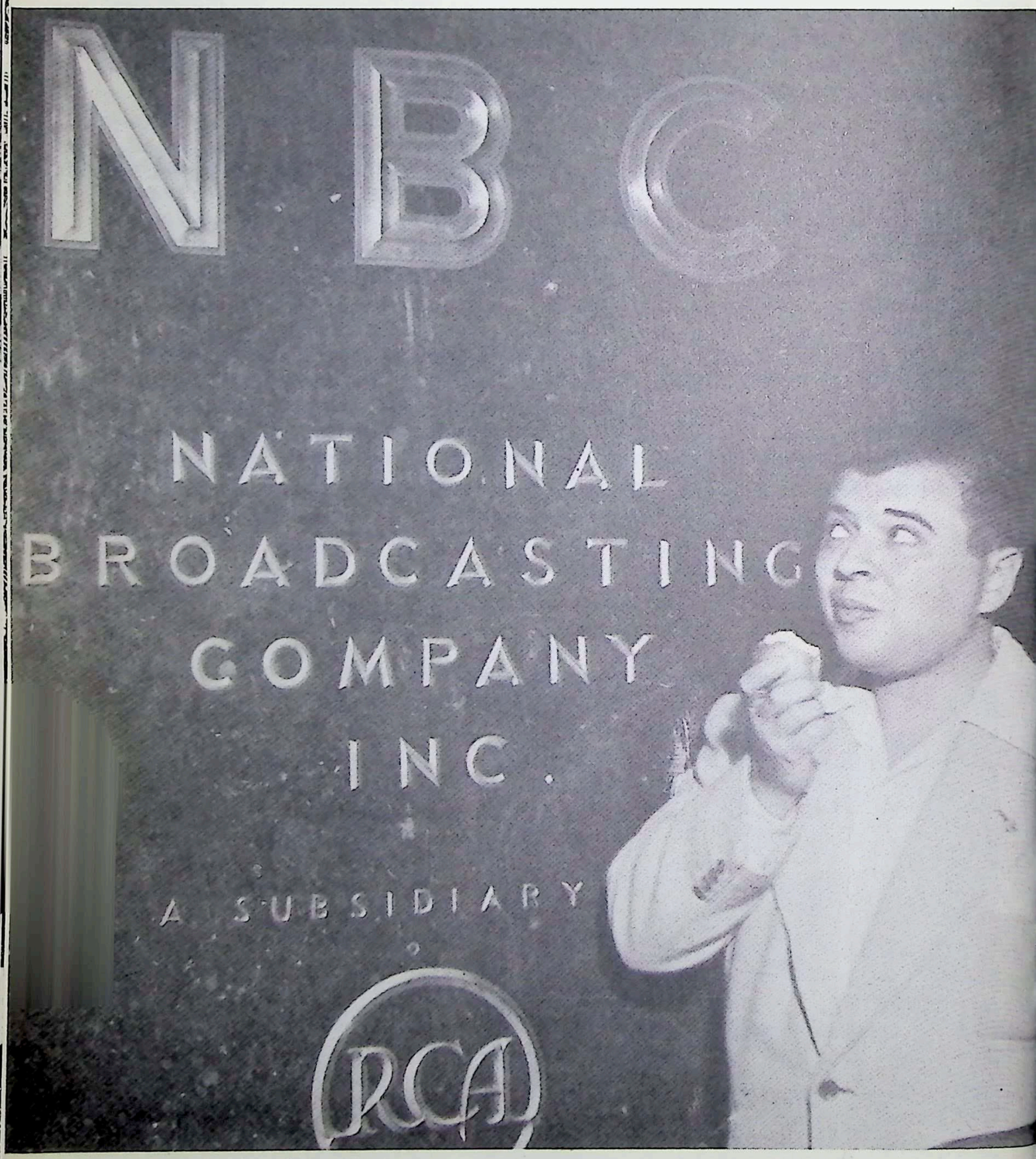
If the full potentialities of educational television are to be realized, we must use not only the know-how and experience of those who operate television stations and build their programs, but also the knowledge and experience of people of the theatre. They can certainly help to make educational material dramatic, interesting, entertaining and effective.

The talents and resources of the theatre and television can be blended for greatly expanded and improved public service. The influence on the human mind, heart and spirit of this medium of mass communication, combined with the arts, stirs our imagination. Its capacity for serving the best interests of mankind, especially in these years of crisis is very great, indeed.

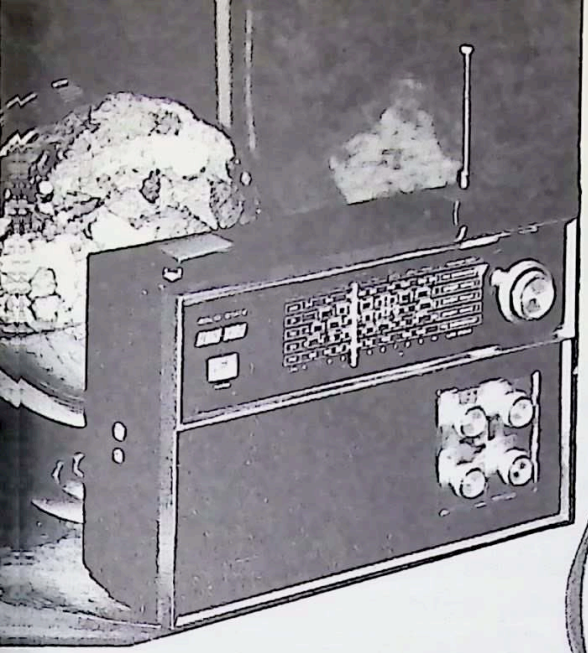



*Sir Laurence Olivier, the greatest living actor of our time and the most brilliant and successful interpreter of Shakespeare's immortal plays, previewing the special edition of Wisdom Magazine which was published in tribute to his wisdom and distinguished achievements in producing, directing and acting in such memorable Shakespearean films as "Henry V," "Hamlet," and "Richard III." Aside from his Shakespearean stage and film productions, Olivier, an eminent recipient of the Wisdom Award of Honor, has appeared on the screen and on NBC-Television in many notable motion pictures.*

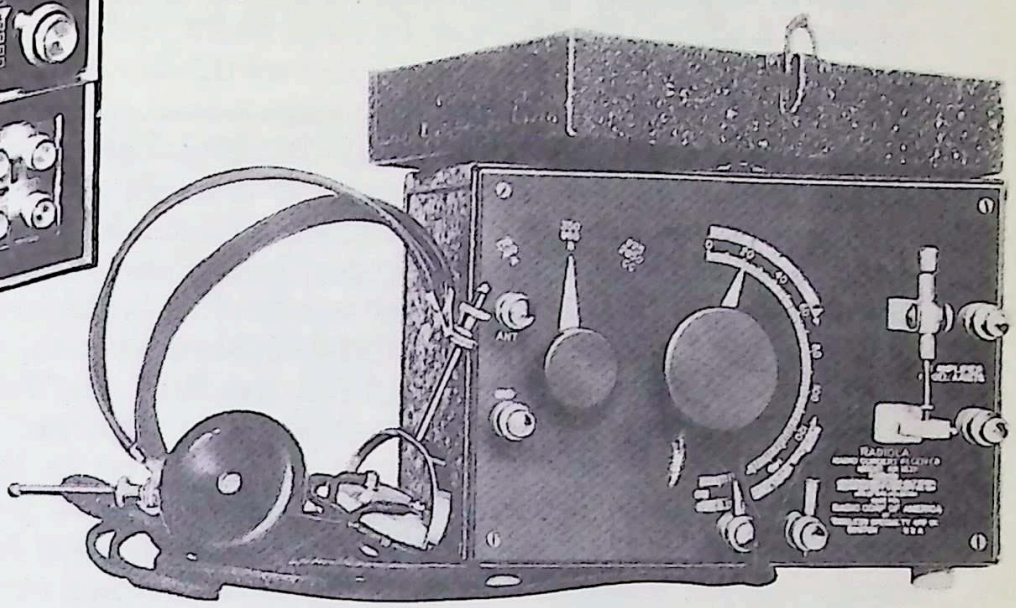
# THE WORLD OF




*Admiring the famous NBC inscription on the marble facade of the RCA building, New York, is Ezra Stone, whose fame as the star of NBC's "Henry Aldrich" radio series came early in life and earned him a fortune.*



*Today, RCA's Strato-World radio (left) features six-band performance and solid-state circuitry.*




*Radiola (above, right) one of the first radio sets ever put out by RCA, appeared in 1922 with an attached headset. Later models had loud-speakers. General Sarnoff's first love was radio. In 1915 he sent a now historic memorandum to the company's general manager describing a "radio music box" which he said would bring music, news and entertainment into the home. He is shown here (below) holding RCA's refinement, the pocket-size transistor set which, like the electron tube, is a master key to the continuing expansion of electronics.*

Radio Corporation Of America has its roots deeply embedded in the history of radio communications as a science, an art and an industry. Through research and engineering, RCA has pioneered and put into practical use many of the outstanding developments in the field of radio science and it leads the way in electronics and television. The seed was planted when Maxwell offered the world his theory of the ether, and Hertz produced the electromagnetic waves. The growth began when Marconi sent the first faint signal in 1895. Unending research and pioneering nurtured it—first, across Marconi's garden, then across the English Channel in 1899, across the Atlantic in 1901, and on and on to encircle the globe—with messages, music and pictures traveling at the speed of seven and a half times around the world in a second.

Marconi applied for his first British patent on wireless telegraphy in 1896. A year later, in July, 1897, the Wireless Telegraph and Signal Company, Ltd. (the name was changed in 1900 to "Marconi's Wireless Telegraph Company, Ltd.") was incorporated in England as the first commercial wireless organization. That was the year J. J. Thomson discovered the electron which the radio tube was destined to generate and control. It would revolutionize all radio and extend its services for the benefit of mankind. Vital steps in this process were Fleming's invention of the valve detector in 1904, and DeForest's invention of the three-element tube, which he named the audion, in 1906. In the meantime, Marconi had added success to success by increasing the range of his invention. Ship and shore stations were equipped. Ships of war as well as ships of commerce used the invisible method of signaling, and soon the wonder of wireless was front-page news throughout the world. The *S.S. Republic* disaster in 1909 and the tragic sinking of the *S.S. Titanic* in 1912 revealed the great usefulness of wireless on the oceans. The Marconi Wireless Telegraph Company of America, organized on November 22, 1899, contributed much to the advance of wireless as the years went by. It served the nation in peace and in war.

With a wind-tossed box kite holding a thin wire antenna aloft in the stormy sky over Signal Hill at St. John's, Newfoundland, Guglielmo Marconi plucked three barely audible dots out of the electric air. It may have been prophetic that the signal, flashed across the sea from England's coast of Cornwall, was the letter *S*.

*S*—for Sarnoff. The last-name initial of a ten-year-old boy who had then been in the United States only one year, and who was destined to be both prophet and father to the greatest communications complex in the world.

That was December 12, 1901. There was great promise for communication without wires—"wireless" for the "fist" of the telegrapher and "radiotelephony" for the human voice. But there was a flaw in the hope. For the next two decades there was grave concern over the lack of privacy in wireless communications. All thinking was still pointed toward point-to-point communication. It was disconcerting that the signals scattered every-which-way and that anyone who cared to could listen in. Most remarkable is the fact that David Sarnoff anticipated broadcasting, as we know it today, even before its functions were clear and its applications proved by those inventors experimenting with the elements that made it all possible.

The lack of privacy was truly a factor. Little more than ten years later, in April of 1912, David Sarnoff picked up the message: "S.S.

Titanic ran into iceberg—Sinking fast" and brought the world's attention to the radio station atop the Wanamaker store in New York where he worked. The President of the United States had to close down the interference—even though well intended—by coastal stations and vessels outfitted with transmitters. Sleepless and almost without food for three days and nights, David Sarnoff had the waiting world's attention turned to the rooftop station which the department store had intended primarily for communications with its Philadelphia, Pennsylvania, branch store. Three years later, while the lack of privacy was still being berated as the wireless-weakness that would keep the medium from becoming a sound business enterprise, David Sarnoff saw this weakness as the spine of a great medium. He fleshed it out in a verbal blueprint, predicting what was to become the broadcast industry and the gigantic commercial broadcast service that is the National Broadcasting Company. It was then that he began the series of predictions that have consistently remained ahead of their time.

In the fall of 1915, even though one or two of the wizards of the new electric world had skirted fuzzily thought out plots for using the new device for mass communications and then left it to die, David Sarnoff detailed plans for radio aimed at the homes of the then fifteen million American families. The memorandum is still in the archives. He suggested bringing music into the home by wireless, thus making radio a household utility like the piano or phonograph. The transmitting problems for music and voice had already been solved and he foresaw the receiver designed as a simple "Radio Music Box" arranged to receive several wave lengths and "placed on a table in the parlor or living room" and obtaining sufficient reception to make the "performance enjoyable." In the same memo, Sarnoff envisioned "receiving lectures at home . . . also, events of national importance . . . baseball scores."

It was half a decade or more later that David Sarnoff's prediction for radio was vindicated. On July 2, 1921, David Sarnoff and J. Andrew White—who was later to become the first president of CBS—with the help of recently polio-stricken Franklin Delano Roosevelt, borrowed the biggest radio telephone transmitter in the world from the United States Navy (Roosevelt had been Undersecretary of the Navy) and brought listeners the world heavyweight championship fight between Jack Dempsey and Georges Carpentier in what the Reuter's news organization was to call "the world's first real broadcast." From there, it was a short step to NBC.

These forty-one years have been fast, hard, productive years of invention, innovation and improvement for the company, as well as its mass audience—a population portion that, however meager at NBC's inception, now embraces all of America and a fair share of the eavesdropping world. Today, the network company's trailblazing in color television is rewarding RCA's investors and has almost totally converted the television world to tint. The role of the parent company in the nation's satellite programs has also put NBC within immediate reach of the news centers of civilization and even the more remote newsmaking corners of the world. The future is boundless, and NBC will vigorously continue to assert the very first role it ever undertook—that of the great innovator.

Founded in 1926 at the suggestion of David Sarnoff, NBC was the first radio network anywhere, anytime. In those historic days when individual stations both floundered in their search for fresh programing

and staggered under the burden of creating the full schedule load alone, NBC's highly original concept of a single program source for everyone —the network—set a pattern that was to mature and improve the industry. NBC spearheaded the improvement of audio quality with the construction of heavily soundproofed studios in New York near which, within a few years, a revolutionary new office community was to rise (Rockefeller Center), incorporating the lively heart of broadcasting and related activities. It came to be known as Radio City.

NBC was first to take the radio microphone out of its padded cloisters and set it up, naked and honest, on location—the origination of remote broadcasts which are still an almost sovereign aspect of radio. In its search for broadcasting improvements, NBC was first to provide extensive coverage by signing the biggest and best available stations in the nation's greatest markets—and then to abet that coverage with the best available headliners in the land. It was the first to create its own stars, personalities like Fred Allen and Jack Benny, making their names as familiar to America as Santa Claus'—and even more believable.

NBC, first to offer a coast-to-coast broadcast by airing the Rose Bowl game on New Year's Day in 1927, was also the first to carry broadcasts direct from Europe via short wave. And NBC, in 1928, was first to open the doors to television for science and sponsors alike. It acquired the first license for a commercial station, today's WNBC-TV New York, and has had its own television operation on the air steadily ever since 1939.

Sound on film was an RCA-NBC first, developed out of competition with Vitaphone Sound on a disk and, perhaps, in unsuspecting unawareness of the whole wild industry that invention would foster—talking pictures. These are fragments only of NBC firsts, but it is difficult to cite all of the achievements that accrue day by day, every day.

And so on the night of November 15, 1926, the sky waves burst with an inaugural network program. Most of it originated from the chandeliered grandeur of New York's grand old Waldorf-Astoria, ironically the future site of the Empire State Building which is topped today by the greatest antenna array in the world and includes that of WNBC-TV. In fact, the same site saw NBC experiments in television as early as 1931, only five years later. The ballroom was filled with notables who sat in thrilled silence through a performance that lasted nearly four and a half hours, cost an estimated $50,000 and showcased talent as notable and glittering as the guests.

The international comedy kings, Weber and Fields, represented the ending of one theatrical epoch. And speaking in an Oklahoma drawl that the Ziegfield Follies had already made famous, Will Rogers, originating from Independence, Kansas, in one of the first remote broadcasts, represented the beginning of another epoch. Comedy artists were complemented by the great serious music talents of the day—opera star Titto Ruffo, Walter Damrosch and the New York Symphony Orchestra, and diva Mary Garden who, introduced by Milton Cross, sang *Annie Laurie* from her capital city of Chicago, another first in remote broadcasting. The New York oratorio society with Albert Stoessel provided vocal drama. Edwin Franko Goldman and his musicians proved there was nothing so enjoyable as a big and brassy brass band. And, for the sophisticated there were pickups from the chic society bands of the day as they performed in New York—Vincent Lopez, Ben Bernie and George Olsen. It took the industry twenty-five years to figure out an apt word for such

programing, and then the word came from NBC—Spectacular.

The network, during the first program, consisted of twenty-five stations—twenty-one charter affiliates and four that were specially added. Never before, even during such continent-coursing conflagrations as the Civil War, had so many people stopped their lives to do the same thing at the same time—listen to the radio. Radio—and NBC—hadn't been invented in an hour, however. The start had actually occurred when the dot-and-dash transmission of Guglielmo Marconi's (Marconi, awarded the Nobel Prize for his invention, was to live until 1937—long enough to see network radio reach adulthood) wireless, or radio telegraphy, was advanced into a wholly new realm by combining its concepts with those of Alexander Graham Bell's telephone. Voice was added to code and it became known as the radio telephone. But even that new invention contained a built-in liability. It lacked privacy, for, instead of "narrowcasting" voices, it "broadcast" them. Anybody could listen in, and that left it with little tactical use during World War I.

In 1919, government and industry leaders agreed that the steps toward radio should be deliberately planned. They cooperated in forming a new company called The Radio Corporation of America, designed to acquire assets of the British-dominated American Marconi Company and thus establish domestic control over fundamental radio patents—and establish it in American hands during the tense years of World War I. With its just-acquired Marconi grants, RCA then launched arrangements with General Electric to cross license each other's patents. That was followed by further agreements with American Telephone and Telegraph and others. Thus, rights were staked out, groundwork was laid for the manufacture of transmitters and receivers, and the way was clear for a volatile young industry to develop.

In the Twenties, radio seemed like fun and men crawled out from under their Model Ts to make their own cat whisker-and-crystal receivers. There was plenty to listen to, for many hobbyists took to the air, programing for friends and neighbors. Little by little, top-of-the-garage operations evolved into commercial stations—sometimes through change of ownership as well as call letters. And radio became a serious business that would help boost the nation to new economic heights. New stations opened all over the country and, like a prairie fire whipped by unchanging winds, broadcasting proliferated from a few hundred stations in 1922 to an estimated 1400, including both the amateur and professional, by the end of 1924. Many operated on the basis of novelty alone. It was sheer pandemonium.

But as magically as the novelty had caught on, suddenly it wore off. Programs seemed as pallid and ill-planned as they were. Schedules were irregular, if they existed at all. And many broadcasters were confronted with the stark reality of their hurried origins. The turn of events was predicted. David Sarnoff, who in 1922 was general manager of RCA, wrote that "when the novelty of radio has worn off and the public is no longer interested in the means by which it is able to receive but, rather, in the substance and quality of what is received, I think the task of reasonably meeting the public's expectations and desires will be far greater than any so far tackled . . ." When that occurred, he predicted, broadcasting would become "a job of entertaining, informing and educating the nation and should, therefore, be distinctly regarded as a public service." He also pointed out that furnishing such service on a national

scale called for a specialized broadcast organization, which did not then exist. That was the gap NBC was to fill.

Then came the day—and the new concept. The New York morning papers for September 13, 1926, announced a new organization in an advertisement placed by RCA. The new company's purpose: ". . . to provide the best programs available for broadcasting in the United States." The name of the organization was, of course, the National Broadcasting Company and it had been incorporated four days earlier in Dover, Delaware. Ownership was divided among RCA (fifty per cent), General Electric (thirty per cent) and Westinghouse (twenty per cent). When unification was undertaken and completed four years later, RCA acquired the other participants' interests and, since January 1, 1930, has been sole owner of NBC.

As for network shows, that September newspaper advertisement explained, "The National Broadcasting Company will not only broadcast these programs through station WEAF, but it will make them available to other broadcasting stations throughout the country so far as it may be practicable to do so, and they may desire to take them. It is hoped that arrangements may be made so that every event of national importance may be broadcast widely throughout the United States. Thus, the concept at last became actuality.

The network went into immediate operation from the WEAF studios, located in the building of the former owner, AT&T, on lower Broadway in downtown Manhattan. Line charges from AT&T for the original twenty-one-station network were one million dollars a year, a rate that, even though guaranteed for the subsequent ten years, was an enormous amount in those days. Today's line charges are in the range of more than fifteen million dollars annually, and NBC is AT&T's second biggest client. The United States government is first.

Within a year of its founding, NBC moved its studios uptown into acoustically engineered quarters considered the country's first true professional broadcast studios. It was there that audiences first became a deliberate part of broadcasts—some say it happened when Will Rogers, a theatrical war horse in need of a responsive army, stepped into the halls and invited visiting tourists to come in, "set" awhile and watch the show.

It was clear from the beginning that the network filled a deep and gnawing need. As David Sarnoff explained more than a decade after NBC's founding: "The deluge of mail, phone calls and even personal visits of different cities' emissaries removed all doubts of NBC's practicability. It quickly became apparent," he recalled, "that a single network service was not enough to satisfy the demands of the radio audience for diversified programs of national interest and importance; that if broadcasting were to be popularized at all, there should be more than one type of program simultaneously available . . ." So NBC set up a second network on January 1, 1927—less than four months after its own founding. It is said that engineers who drew circuitry maps of the two operations became confused and, to keep things straight, identified them by two colors found in the common colored pencil—red and blue. Thus, NBC became the Red Network and, with WEAF New York as its flagship station, included the twenty-one stations of its broadcast debut. The offshoot had six affiliates at its start, utilized WJZ New York as its key station and was known as the Blue Network.

The NBC concept had been set, the map drawn, stations quickly

signed and broadcasts begun. All that remained was to make the very first element of the dream, quality programing, come true. To assure A-1 presentations, NBC named a Public Advisory Council of twelve (later nineteen) nationally prominent citizens—in fact, so prominent that the hand-picked list read like a celestial *Who's Who.* The Council made policy decisions in areas of ethics, good taste and public interest. Following their guideposts, NBC traveled the pioneer's road by delivering civilization to the wilderness via radio.

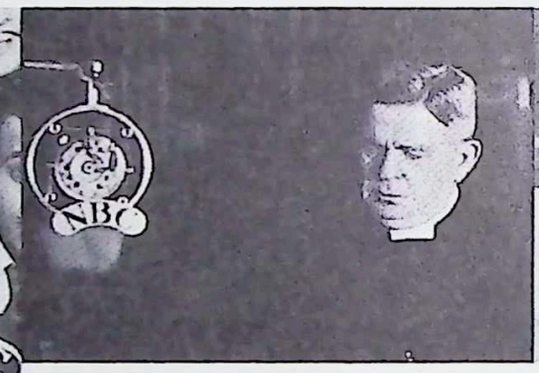
Music especially was emphasized. In 1928, Dr. Damrosch inaugurated a weekly sixty minutes called the *NBC Music Appreciation Hour,* which ran every week of the school year for the succeeding fourteen years. On Christmas Day, 1931, the first complete opera ever to be broadcast from the stage of the Metropolitan Opera House, *Hansel and Gretel,* became the first of a season-long weekly series that, for the next ten years, NBC carried almost wholly at its own expense. In 1937, the network formed a symphony orchestra of its own, composed of eminent musicians. To lead it for the next dozen or more years, David Sarnoff was instrumental in wooing the late, great Arturo Toscanini out of retirement. In less imposing but widely popular veins were Atwater Kent and the Palmolive programs, the A&P Gypsies, the Ipana Troubadours, the Clicquot Club Eskimos and Cities Services Concerts with Jessica Dragonette.

By the time radio reached full maturity in the mid-Forties, NBC was devoting thirty-five per cent of its weekly schedule to such musical programs as *The Bell Telephone Hour, International Harvester Program, Voice of Firestone, Carnation Contented Hour, Album of Familiar Music,* American Tobacco's *Hit Parade,* the Chesterfield *Supper Club* and the daily *Fred Waring* program. As leavening for its heavily nutritional music programing, NBC has always made certain that the spice of variety shows and the saltiness of family-type comedy were sprinkled generously throughout the programing week.

In the early Thirties, radio's top stars were radio-born and bred—The Happiness Boys (Billy Jones and Ernie Hare); the Sweethearts of the Air (May Singhi Breen and Peter DeRose, radio's first husband-wife team); and Major Bowes—often backed up by, or adjacent to, a top dance band like Vincent Lopez' or Paul Whiteman's. The great years of radio variety, however, began toward the end of the Thirties when radio's top salaries, fast and far-reaching fame and the competitive bidding of other networks were such strong lures that performers happily hopped over from other areas. Some came from the stage (Ed Wynn), some from the movies (Bing Crosby), some from nightclubs (Jimmy Durante), and some had done their basic training in burlesque (Red Skelton). And those that stayed longest had qualities that were made famous by radio alone—Fred Allen, Eddie Cantor, Jack Benny, Bob Hope, Edgar Bergen.

Just as comedians were attracted to the great new medium, so too were dramatic stars. NBC wrote another first in its record book by pioneering plays for dramatic presentation on radio—a process that also worked with novels and short stories. NBC's earliest drama, *Great Moments in History,* began November 16, 1926—the day after the network's debut—and theatre supercharges NBC today, whether a television daytime drama or a weeknight movie. The mode has long since evolved—a dramatic star isn't really a star until he's emoted before the microphone and television camera. And the NBC Guest Book

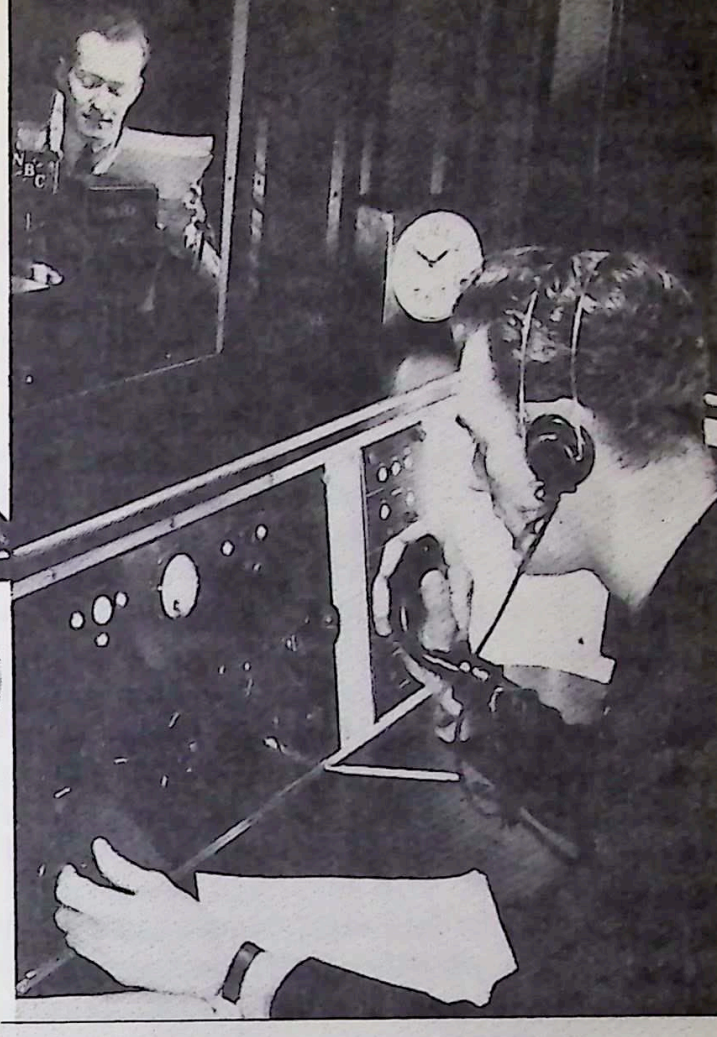
*Actors broadcasting in the NBC studio, in 1926, with sound effects.*



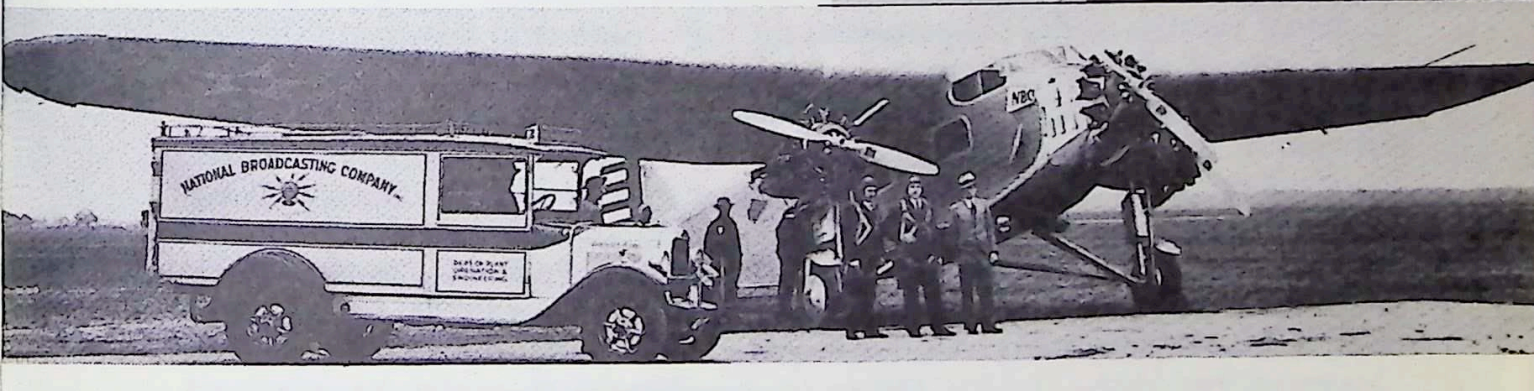
*Dr. S. Parks Cadman (above, left), noted clergyman, pioneered in a weekly religious series over NBC. Graham McNamee (above, right), interviewing Babe Ruth.*

*Broadcasting from Egypt (below) in the early days of NBC.*

*Jack Dempsey (above), in 1923, with radio announcer Graham McNamee. (Below) NBC sportscaster Bill Stern.*




*Comedians Weber and Fields (above, left). Radio studio control room of 1930's (above, right). (Below) In 1929, an NBC radio mobile unit succeeded in making contact with an airplane— the first remote broadcast.*



*Will Rogers*

*Rudy Vallee*

lists them all—from Adams, Maude, to Young, Loretta.

Because it could so easily add day-to-day installments, NBC took the dramatic format and evolved another broadcast specialty, the serial drama. This format was born mature when, in 1928, WMAQ Chicago (later to become an NBC-owned station) presented two individualized characters, *Amos* (Freeman Gosden) *and Andy* (Charles Correll) in daily dialogues. The local program was quickly snapped up by the NBC network, where it was even more quickly embraced by the American public. Domestic and sometimes even national political schedules were planned so as not to interfere with the early evening show. Format established, the fifteen-minute serial also became a prominent feature in daytime radio, under the familiar sound of the NBC chimes—*Pepper Young's Family, Road of Life, Ma Perkins, Little Orphan Annie, Portia Faces Life, One Man's Family, Young Widder Brown.*

Besides offering music, comedy and drama, NBC remembered its early vow to broadcast events of national importance. From its inception until today, NBC has been unflagging in allocating the money, effort and airtime—both on radio and television—necessary to provide first-rate broadcast journalism. The NBC beat is literally the world. The late H. V. Kaltenborn, for years the dean of news broadcasters, started his regular weekly broadcasts via WEAF New York in 1923 and joined NBC shortly after it was formed. The new organization also programed weekly talks about Washington matters, European events, and the national economy. The "commentator" had come into his own.

Tepid as it may sound to today's youth, the 1927 trans-Atlantic Lindbergh flight somehow capsuled in one event, not only the whole decade of the spirited Twenties, but also the end of one epoch and the start of another. When "Lindy" returned to the United States, NBC was there to meet him—and all the challenges his arrival brought to its young facilities. The network posted Graham McNamee in the Washington Navy Yard (where Lindbergh landed from a cruiser), John Daniel in the Treasury Building (to describe the Pennsylvania Avenue parade), Milton Cross in the Capitol Dome (to eyewitness the official reception) and Phillips Carlin at the top of the Washington Monument (to wrap it all up). Meeting the Lindbergh challenge corroborated NBC's confidence that on-scene coverage was as practical as it was promising. In 1928, NBC News' first coast-to-coast program featured Presidential candidates Herbert Hoover and Al Smith.

But early 1929, at the crest of the Twenties, proved the tidal period for broadcast news. In that year, NBC made its first regular use of foreign correspondents with William Hard in London, while the ubiquitous Floyd Gibbons covered the world by land, sea and—literally—air. NBC was first to broadcast from a plane in flight on Washington's birthday in 1929. In quick succession, the NBC news staff in 1929 added sparkle to such now-legendary names as Lowell Thomas, Boake Carter, Dorothy Thompson and Richard Harkness. Reaching out meant also reaching down—and up. The first broadcast on a submarine was carried by NBC in 1930. Two years later, the monogramed microphone was ten miles up in the air, traveling with August Piccard in his historic balloon ascent over the Dakotas. There was no calling a halt. Radio was next emulating Jonah and sending forth topical talk from 2200 feet under the ocean—its "whale" was the Bathysphere designed and developed by William Beebe.

And direct coverage from Europe became more frequent. When

George V officially greeted delegates to the 1930 London Naval Conference, NBC was there. Seven years later, that king dead and his successor abdicated, NBC transoceanicked its description of George VI's coronation and half of America stayed up all night to hear the predawn broadcast.

By the network's tenth anniversary in 1936, its correspondents were covering wars in Ethiopia and Spain and sending transcripts back to listening Americans. Herb Morrison's eyewitness account of the Hindenburg disaster filled the nation with awe. When the Munich crisis of 1938 cast black shadows over half the globe, many Americans had to read, rather than hear, the historic Chamberlain statement that Hitler would meet him halfway. But not NBC audiences. Although atmospheric disturbances cut off direct short wave transmissions, the network re-routed its circuits from Europe by way of Africa and South America, then to New York. The cost was enormous, but the event was covered and broadcast.

Not all news ears were turned towards Europe, important as events were, and continued to be, overseas. Both the Red and Blue networks of NBC, with only two years' operative experience, showed courage by giving full coverage to national elections as early as 1928. And full coverage meant attending national conventions, covering candidates' campaigns, and then sitting up all of election night to report returns. The network hasn't missed a presidential election since. The broadcasting industry is well aware of the imposing ratings that NBC's political coverage has always had through the years. Perhaps lesser known is the cost—in misery as well as money—that has unstintingly been paid in order to perform this essential and imposing service.

Besides such obviously useful programing, NBC has also carried subtler public service, such as *The University of Chicago Roundtable* (whose early 1931 debut made it the longest-running discussion program), the *National Radio Forum* (the weekly discussion of government problems by political leaders that ran ten years) and the highly popular *America's Town Meeting of the Air* (which started its seven-year run in 1935).

The NBC network has always given special programing attention to children (the Sunday morning *Children's Hour* ran from 1926 to 1942), women (*Consumer Time,* in cooperation with the United States Department of Agriculture, ran from 1933 to 1947), agriculture (*The National Farm and Home Hour* ran from its inception in 1928 until it was incorporated into *Monitor* in 1960 where it is still broadcast under the segment title, *Modern Farm Review*), formal education (from lectures on phonetics to programs guided by the Child Welfare Bureau of the Department of the Interior) and, of course, to religion (*The National Radio Pulpit,* conducted in cooperation with the Federal Council of Churches of Christ in America, was conceived in 1923 and became the longest-established of all religious programs on the air; the weekly *Catholic Hour* started in March 1930 and continues today on television, while several Jewish programs have been broadcast in sequence ever since 1928 with *The Eternal Light* the now long-running current series).

Sports events, one of the most popular formats on the network, have been carried since NBC was five days old—the 1926 Harvard-Yale game in New Haven was the first sportscast. The 1927 Rose Bowl game became the first coast-to-coast radio network program—and has been on NBC

*Arturo Toscanini*

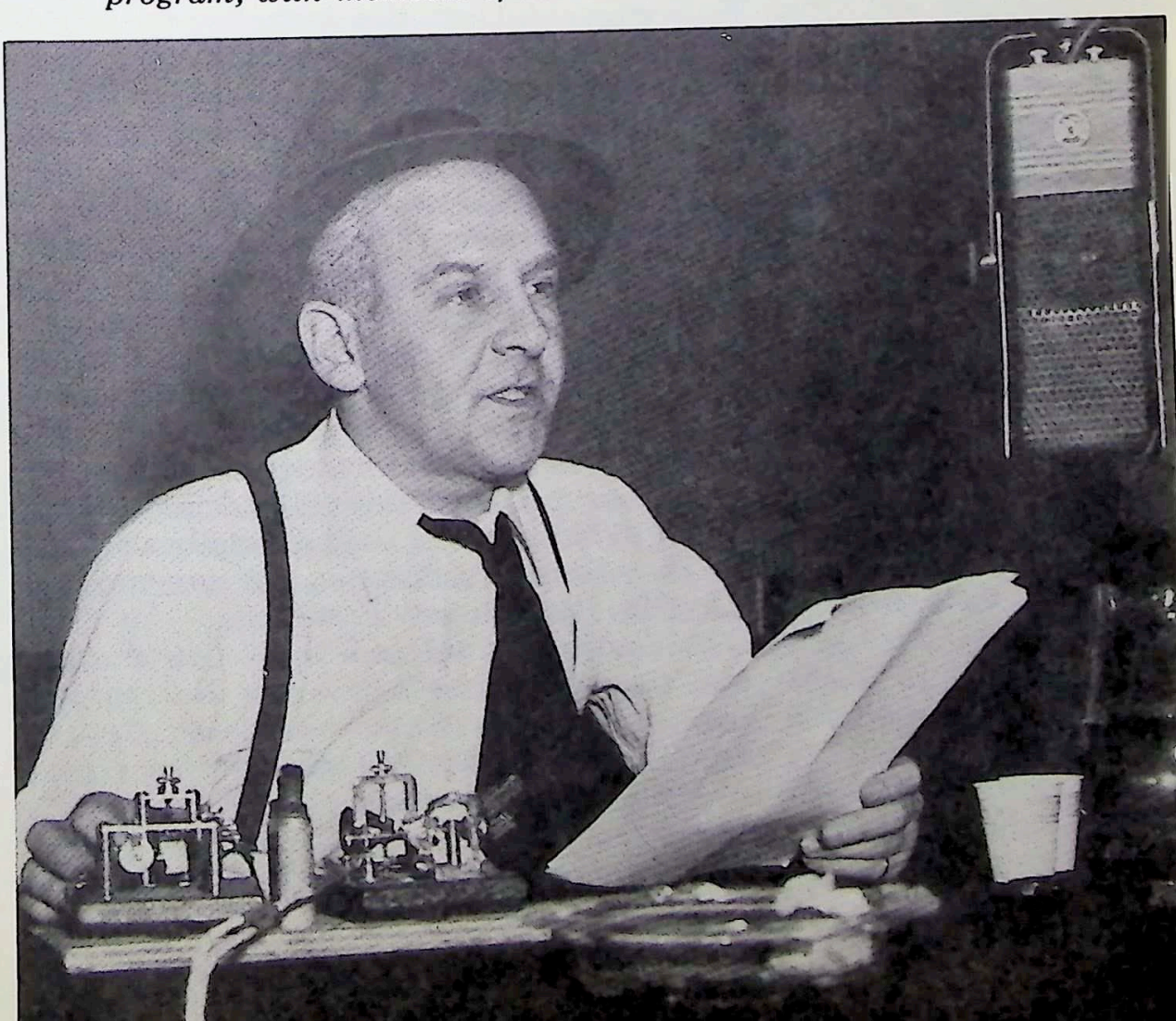
*Paul Whiteman*

*Walter Damrosch*

*"One Man's Family" players (above).*

*Amos 'n Andy (right).*

*Ezra Stone (above, left center), star of the "Henry Aldrich" radio program, with members of the cast. Walter Winchell (below).*



radio exclusively every year since. And in September of that year, the now-famous Tunney-Dempsey bout at Soldiers Field, Chicago, was an NBC exclusive. The first broadcast of the Kentucky Derby, with Clem McCarthy at the microphone, was on NBC in 1929 and, during the Twenties and Thirties the network carried the World Series, Army-Notre Dame football, major golf tourneys and even some of the Olympic Games (from Los Angeles in 1932 and Berlin in 1936).

The National Broadcasting Company had 243 stations affiliated with its two broadcasting networks by 1941. The Red Network had seventy-six and the Blue, one hundred and three. Another sixty-four were listed as supplementary. But the Federal Communications Commission stepped in and, after extended hearings, ruled in May of that year that no organization should control more than one network. As a result of this ruling, NBC first divested itself of the Blue Network in January of 1942. The following October, the Blue Network was renamed the American Broadcasting Company. After the separation of the two radio networks, a total of 136 stations remained as NBC affiliates, of which six were company-owned.

When NBC was formed, it owned only the station it had acquired from AT&T. Its parent, RCA, owned WJZ New York and WRC Washington, however, and turned them over to NBC in March, 1931. Ownership of such stations, located in heavily populated, newsmaking markets, soon became a working necessity if NBC was to continuously provide the national events coverage cited in its charter. The stations provided steppingstone operations bases throughout the country and, as years passed, also provided NBC with its most formidable revenues, too. As a result, NBC acquired WTAM Cleveland in October, 1930, and purchased WMAQ Chicago in 1931.

By 1933, the home studios of NBC were again on the move, this time into the just-completed Rockefeller Center where, with RCA, it became the major tenant. These offices and facilities, including the world-famous Studio 8-H, now the Peacock Studio, have constantly been updated and modernized, not only for radio audience shows, but subsequently for television, and currently, for color. These New York facilities are supplemented today by NBC's up-to-the-minute Color City in Burbank, California (which replaced the earlier, famous NBC studios at Hollywood and Vine), another giant color installation in Brooklyn and, of course, the staffs and studios of affiliates, many of whom are called on to supply network originations from time to time.

On special occasions from 1925 through 1928, NBC engineers had short waved programs overseas, a function taken over by engineers of RCA Communications, Inc. in 1929, although NBC continued to supply the programing. The whole service reverted to the broadcasting company, however, in 1930. And six years later, NBC established its International Division in order to undertake, for the first time, a regular daily schedule of international programs. They were broadcast in six languages—English, French, German, Italian, Spanish and Portuguese—for audiences in Latin America and the Far East as well as Europe. The purpose was not only to supply entertainment and news, but also to depict the American point of view in a world that was edging toward war. And, by 1938, NBC alone was transmitting 16,500 overseas broadcasts per year, an American volume that was increased by the also-voluntary short wave programing of other broadcasters too. But the total United States effort was slight when compared to the massive volume from all the British

Commonwealth and, of course, the highly specialized broadcasts that had become the chief propaganda weapon of the dictators.

As early as 1938, David Sarnoff made a personal call upon President Roosevelt and State Department officials to stress the importance of short wave as an "instrument of national policy." But not until a year after Pearl Harbor was his advice taken, when the government undertook its own transmissions. By then, NBC was operating two ultra-powerful transmitters at Bound Brook, New Jersey which, in fact, had been in service even before Hitler's 1939 invasion of Poland. The government contracted for their full-time use, on a non-profit basis for NBC, and for the NBC International staff which thereafter wrote, produced and broadcast only for the Office of War Information. Before the war was over, transmission was in ten languages—Danish, Swedish, Turkish and Greek had been added to the original six—and programing was directed both at foreign audiences and United States forces overseas. NBC had built another Bound Brook transmitter (while the government erected three more in New Jersey and a like number in Dixon, California), with all nine operated on behalf of the United States by NBC engineers.

Early in the war, the broadcasts' major purpose was to pierce the Axis blackout on world news and, in so doing, to assure both allies and the underground of occupied nations that the United States was on the march. Called the Voice of Freedom, the government-sponsored programing scored importantly even during the height of Nazi victories by letting foreign listeners have news of America's enormous production strides. And reports beamed from the United States were picked up and rebroadcast, also by short wave, by some one hundred and thirty South American stations, members of NBC's Pan American network. The contact these broadcasters established with our allies was especially important during times of our military setbacks—at Pearl Harbor, whenever a major European capital fell, during the fall of Bataan and Corregido and upon the death of Franklin Delano Roosevelt on April 12, 1945.

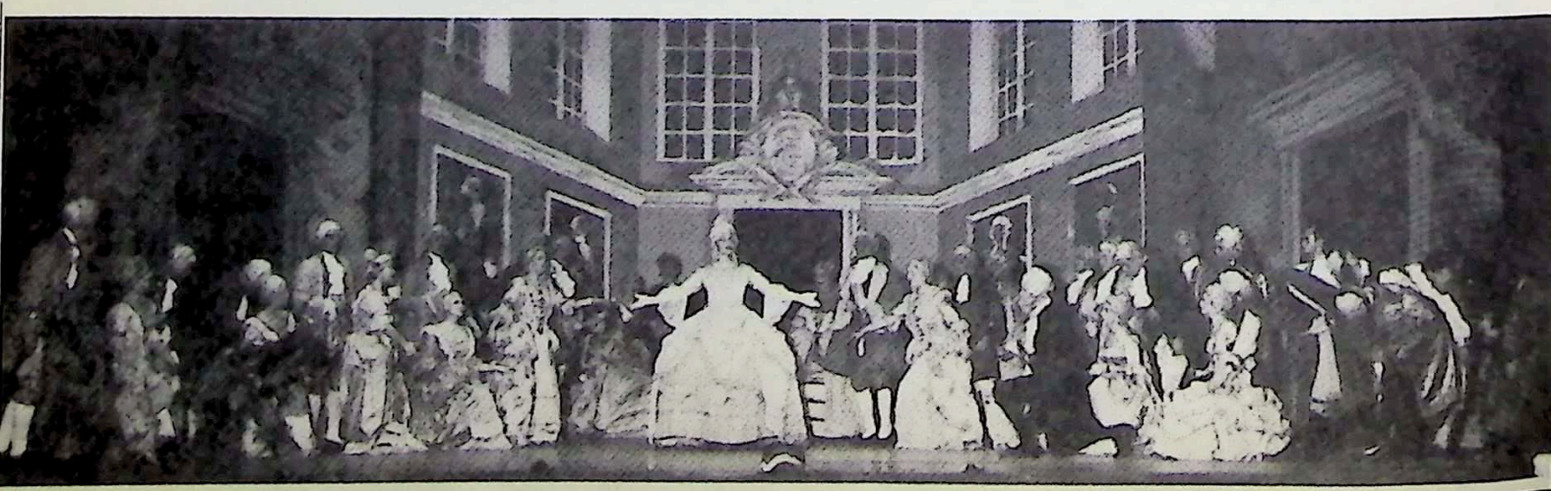
On D-Day, the NBC network, some of whose correspondents landed with the first waves of troops, carried nothing but invasion news for twenty-four hours—bulletins from the front, analysis of their importance and messages from Allied leaders. Upon President Roosevelt's death, the network went into three days of broadcast mourning—no commercial messages were carried in order to give the nation all details of the funeral events. Then, on May 8, 1945, the war in Europe was over, and NBC's W. W. Chaplin broadcast an eyewitness account of the German surrender at Rheims. A few months later, the war in Asia was over too and Merrill Mueller, speaking from the deck of the battleship Missouri in Tokyo Bay, described the surrender: "... there isn't a man here who has any feeling of exultation. Everyone is glad it's over." At the end of hostilities, NBC had sixty-five reporters and commentators—many stationed throughout the world—on its now truly international news staff. Instead of mere bulletins, it was now the custom to report the news in depth. And NBC was determined to maintain its superb staff—and their expert methods—on a permanent basis.

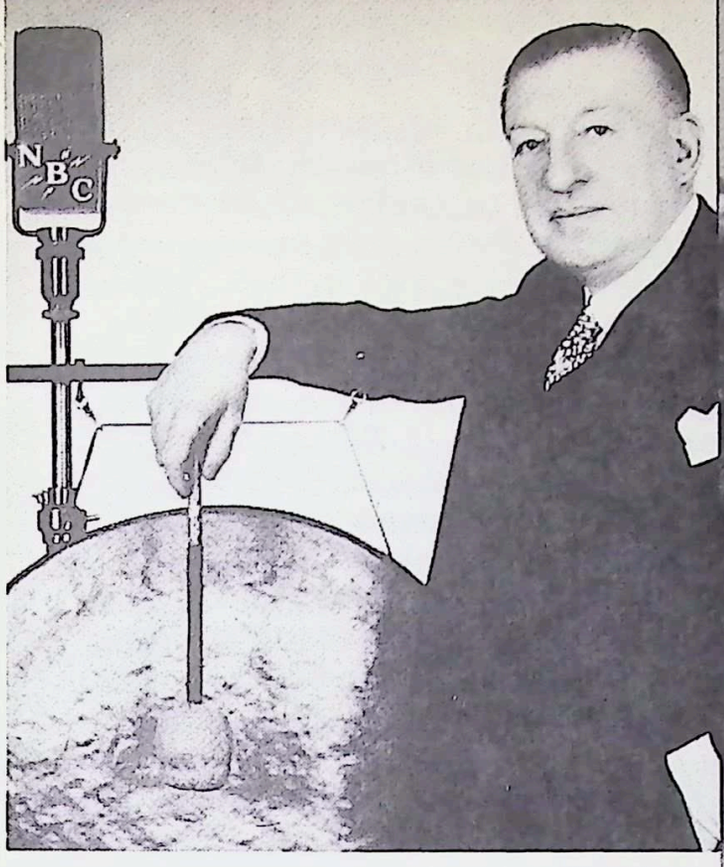
In 1948, the Federal government took over all short wave licenses and assigned them to the Voice of America, operated by the United States Information Agency. Even so, NBC engineers on loan to the government continued for years to operate some of the powerful short wave equipment that had first been built and used on behalf of the nation through

*Joan Fontaine, Tallulah Bankhead and George Sanders.*

*English children (above), evacuated to the United States in 1944, talking to their parents in England by radio. (Right) Quiz Kid Harvey Dytch.*

*The Metropolitan Opera Company broadcasting grand opera.*





*Major Bowes (above). Dinah Shore and Frank Sinatra (right).*

*Bud Abbott and Lou Costello (above). Fred Allen (below).*

the foresight, and capital expenditure, of NBC.

If the wars both in Europe and Asia had brought severe trial and outright terror, so ultimately did they deliver the technological improvements that allowed civilization to start moving forward once again. And, as though by magic, the stage was set for that magical new medium, television. Television was anything but magic or new, however, around NBC. In 1923, David Sarnoff had already written RCA directors: "I believe that television, which is the technical name for seeing as well as hearing by radio, will come to pass in due course . . ." When the NBC radio network was established in 1926, RCA engineers were already conducting early experiments with television. And after an experimental telecast between New York and Washington in 1927, Sarnoff had written: "With the inspiring demonstrations recently made of television, the art of distant seeing, we have passed the point of conjecture as to its scientific practicability. Not only by wire but also by radio can an image be instantly flashed point to point . . . The possibilities of the new art are as boundless as the imagination."

Yet it was not to be a snap. In 1952, the now-General recalled some of the anguish involved when he said, "Research requirements alone—in the beginning and for nearly two decades—were so enormous that only those imbued with an intense pioneering spirit dared to pursue the complex and challenging art."

And yet, considering the difficulties, television's development seemed to pass with speed and ease. In 1928 RCA set up experimental station W2XBS New York. In 1929 Dr. V. K. Zworykin invented the kinescope, which eliminated mechanical scanning in the television receiver. In the same year, scansion was increased to sixty lines per frame. Early in 1930 a television program originating in NBC's Fifth Avenue studios was transmitted onto a six-foot screen for an invited audience assembled in a New York theater. In 1930 NBC took over operation of station W2XBS New York, and in 1931 NBC began experimental telecasts from a transmitter atop the Empire State Building. Scansion was now 120 lines. During 1933 mechanical scanning was eliminated at the point of transmission too with the introduction of the Iconoscope, considered one of the all-time great television inventions. The RCA system thus became all-electronic. In the same year, the first field test of the RCA television system was conducted from the Empire State Building. Scansion was 240 lines. In 1936 the Empire State transmitter was reconstructed according to needs dictated by earlier tests, and it started telecasting 343-line pictures. By January of 1937 scansion was increased to 441 lines per frame and there were 20 experimental television stations on the air. In the fall of 1938, David Sarnoff announced to the Radio Manufacturers' Association that engineering and programing tests had reached the point where NBC could start telecasting on a regular basis the following spring —and that RCA would simultaneously offer its first television receivers for sale to the public. In 1939 NBC inaugurated the first regular television program service in the United States, timed to coincide with the opening of the New York World's Fair. The first program featured an address by President Roosevelt at the official opening of the RCA building there. Except for brief interruptions for changes in frequency assignment and standards, NBC's New York station has carried regular programing continuously since this date.

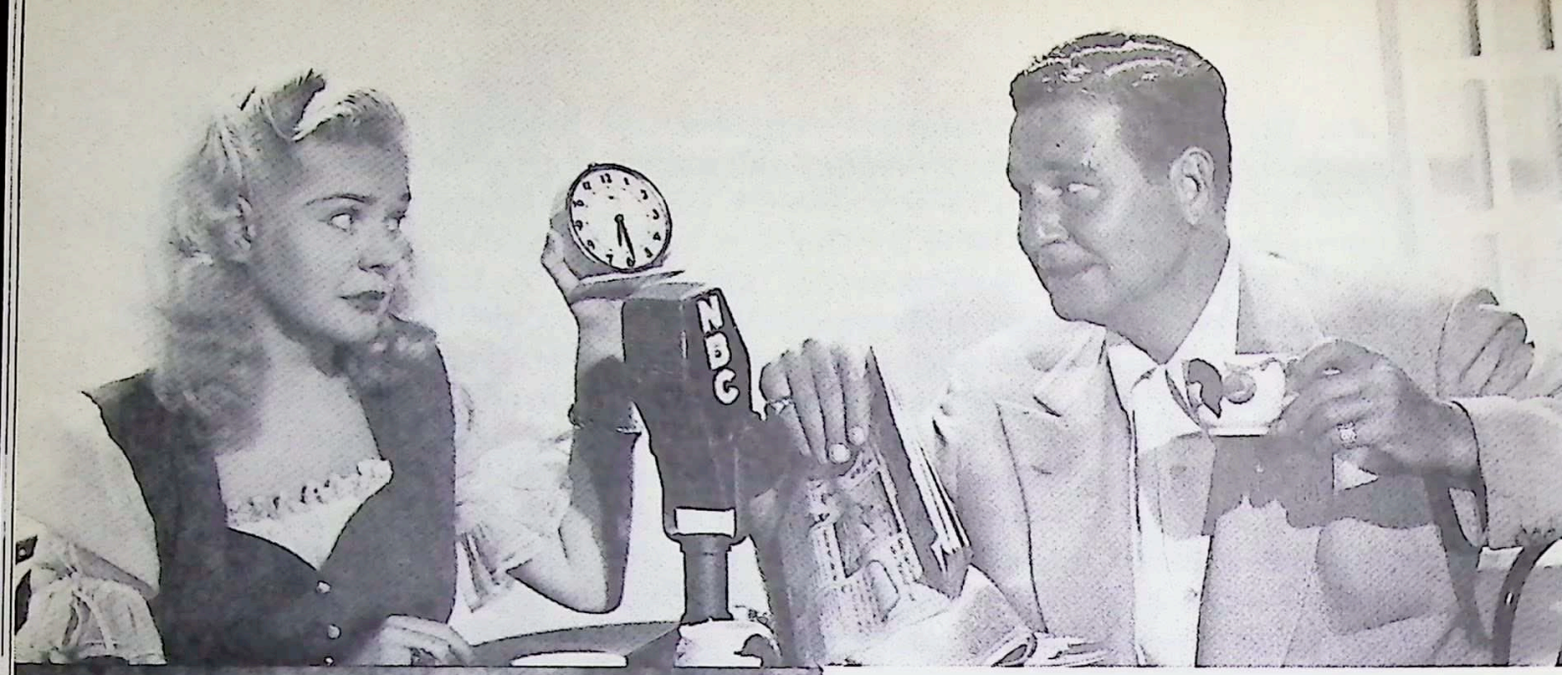
In August, 1953, NBC's *Kukla, Fran and Ollie* program was seen

in the first publicly announced experimental broadcast of a network program in compatible color. Added impetus was given to color programing with the production of *Carmen* by the NBC Opera Company that same year, followed in 1954 by the first color broadcast of the Tournament of Roses parade in Pasadena, and in 1955 by the full Broadway production of *Peter Pan* with Mary Martin and Cyril Ritchard, which attracted a then-record audience estimated at sixty-five million. The growth of color television was slowed down, however, by the reluctance of the other networks to enter this new field. But by 1965 the color boom was on. NBC was presenting almost one hundred per cent of its entire evening schedule in color, and the sale of color receivers was outstripping the demand. No branch of NBC programing underwent a more remarkable growth in the postwar years than did the coverage of news and public affairs. The News Department steadily expanded its staff, facilities, and coverage until its programs now represent about one-fourth of the television network schedule. More than eight hundred correspondents, cameramen, and other personnel are stationed in every news-gathering center of the world.

At first, the emergence of television had a depressing effect upon radio. As television gained a firm foothold, it drained off audience and advertising from network radio and converted what had once been a national entertainment medium into a personalized service. For several years, all radio networks were operating at a loss, and their future was uncertain. As television took over the living room, however, radio sets started moving into other rooms and virtually became standard equipment in automobiles. Portable receivers, clock radios, and pocket-sized transistor sets became popular. But major advertisers continued to reduce or withdraw their radio budgets in favor of the huge audiences of television. NBC decided to do something about it. Its principal step was the conception of *Monitor*—the weekend program service utilizing radio's great flexibility "to go places and do things" and to give listeners the feeling of participation. Coupled with other innovations, the *Monitor* format of programing was able to reverse radio's decline.

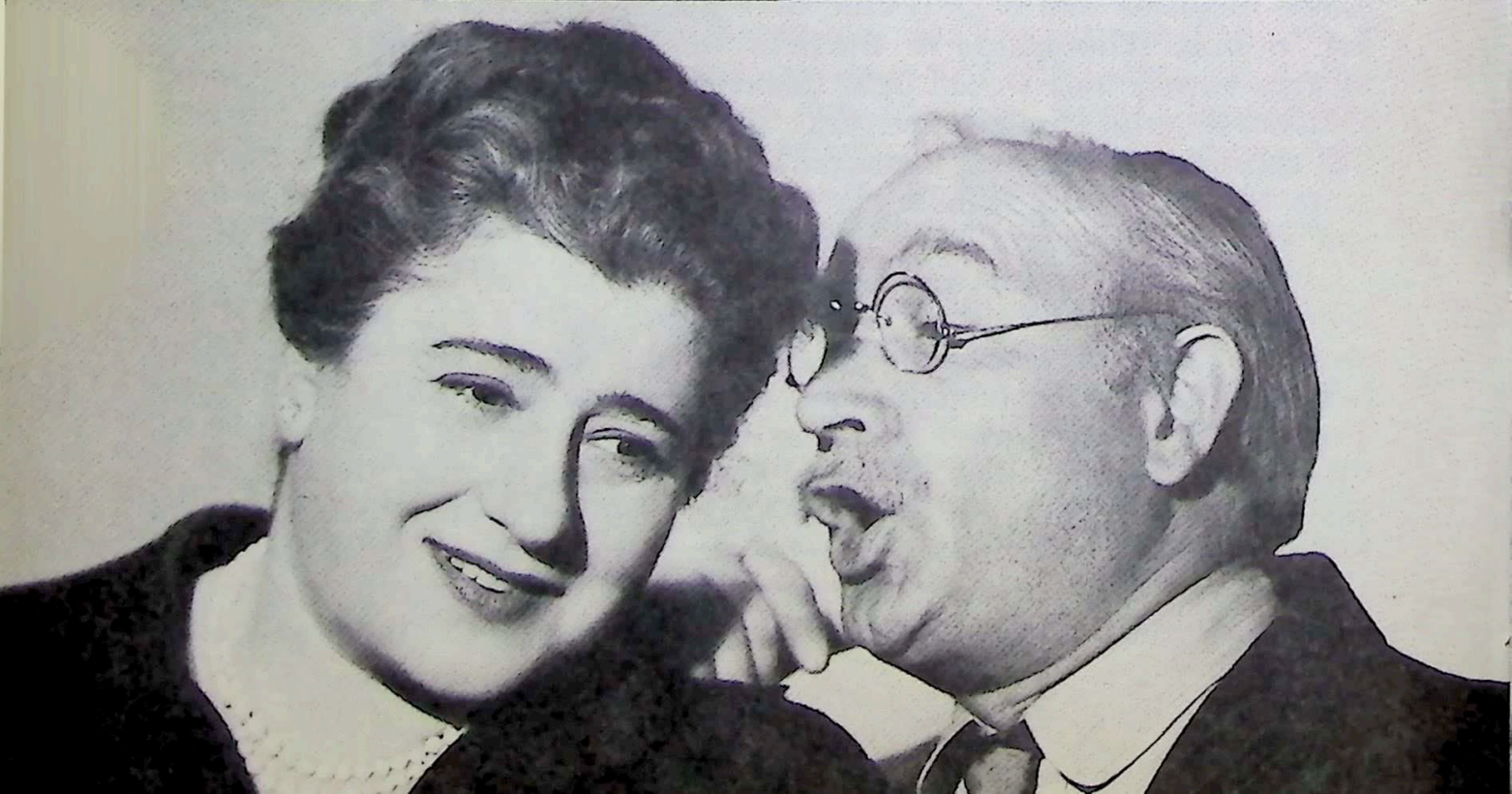
The relationship between the two visual mass media, television and motion pictures, has undergone a fascinating evolution in the last few years. When television first appeared on the scene, the impact on the movie business was cataclysmic. Average weekly movie attendance was cut in half. Thousands of theaters went out of business. The movie moguls vowed they would fight television to the death, and many feared that death would indeed overtake the movie studios. Now the situation has changed. Hollywood's anemic economy has grown robust again. The main reason for the recovery is that the studios that once pledged total war against television have since learned to embrace the new medium.

Will the television movies eventually dominate television? No one knows for sure, of course. Some observers believe that the day of the motion picture on television is only dawning at the present time. Others believe that the filmed television series will outlast the present movie trend. Still others foresee the time when the grand old days of live television will return anew. Whether they endure or not, the television movies at least will have established some interesting precedents in Hollywood—precedents of interindustry cooperation rather than civil war. The television movies have demonstrated how two once antagonistic industries can find the means of helping to solve each other's problems.

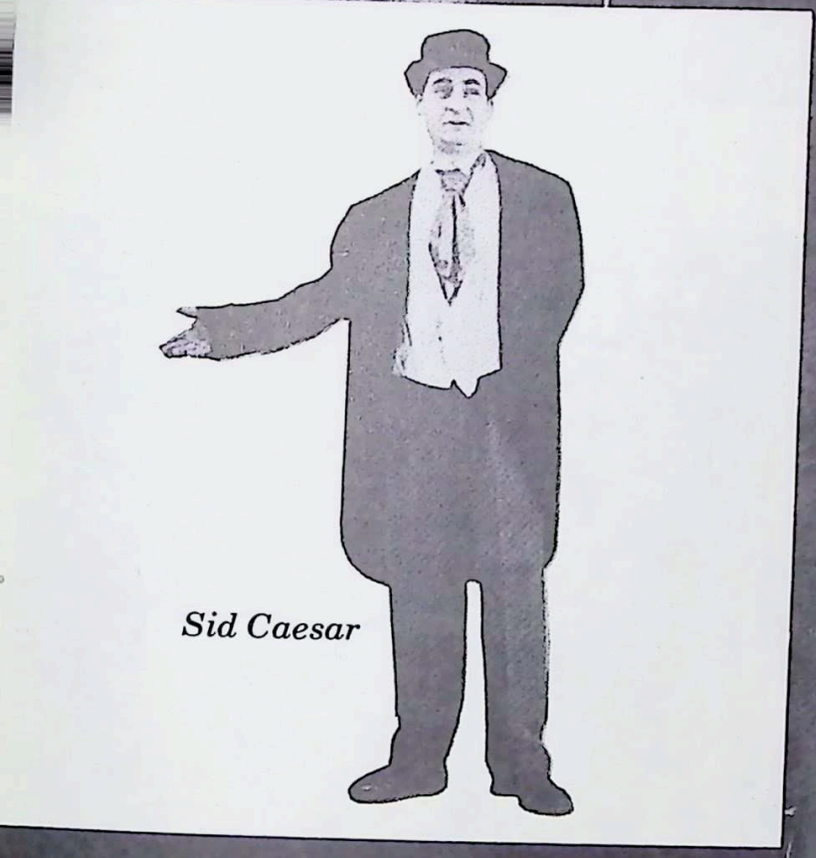


*Alice Faye and Phil Harris (above). Marian and Jim Jordan (left) as "Fibber McGee and Molly."*

*Red Skelton (above). Gertrude Berg (below) as "Molly Goldberg."*



*Bob Burns and Bing Crosby*



*Sid Caesar*

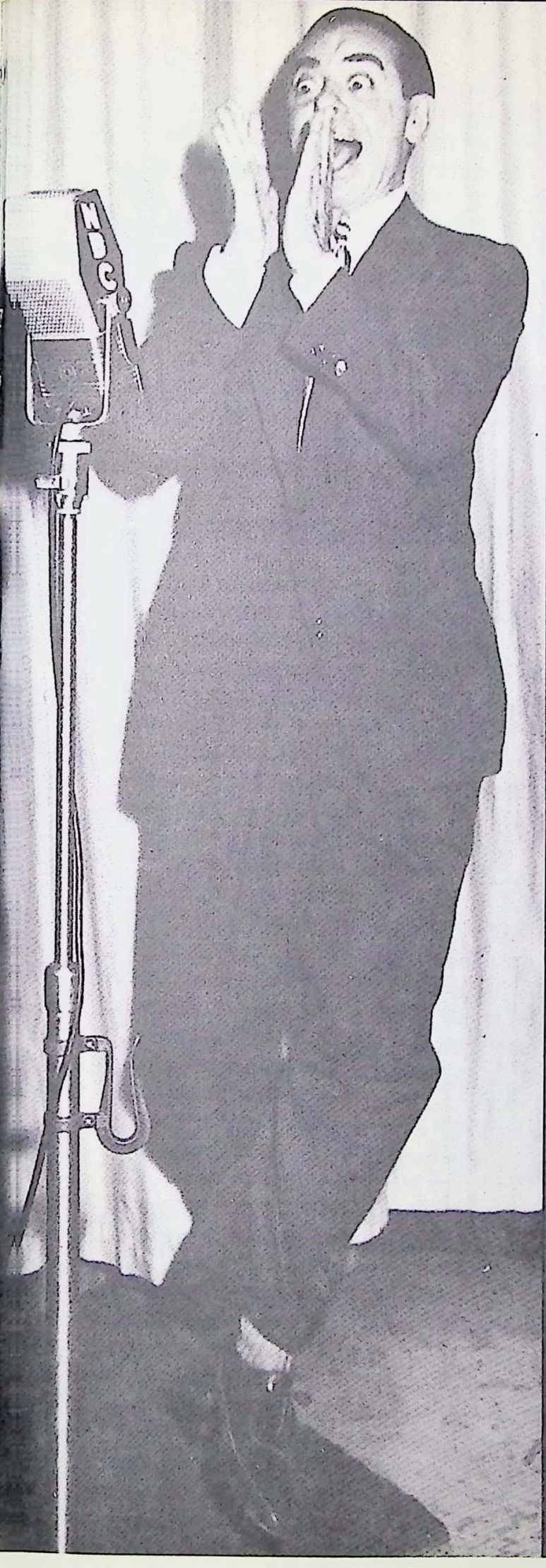
*Fanny Brice*

*George Burns and Gracie Allen*

*Jack Benny and Fred Allen*

*Eddie Cantor and Jack Benny*

*Jack Benny and Mary (Mrs. Benny).*




*Eddie Cantor*

*Al Jolson*

The networks have helped supply new capital to the movie industry and have helped insulate the studios against some of the awesome risks of film making. The studios, in return, have helped to satisfy the networks' seemingly insatiable appetite for new product. Both have gained.

Television shows have become one of the most sought-after United States products for foreign consumption. Today, sixty per cent of the estimated 181 million television sets in use in the world are owned by people in other countries. Approximately 1600 stations are broadcasting daily on 4800 channels in more than one hundred foreign countries. Not unlike their American counterparts, these foreign stations have an insatiable appetite for television programing to fill their expanding broadcast schedule. Most of the television stations in the world have increased their telecasting schedules from three to five hours a day to an average of more than seven hours a day. International television specialists estimate that the total number of broadcasting hours will increase by more than one hundred per cent within the next five years.

While the explosion in the number of broadcast hours overwhelms foreign television film producers, another explosion is upon the world—color television. Today, color is broadcast regularly in the United States, Canada, and Japan, and the leading nations of Europe and Latin America are preparing to advance soon from pilot programing to regular color broadcast service. But at this time, only the United States television film distributors, and primarily NBC International, have a large number of color television programs available for purchase.

Demand and technology are two of the reasons why television programs produced in the United States are seen in other countries. Another important reason is their popularity. Although other countries do not generally have rating services as we know them, reports of a program's audience are recorded in popularity polls. The most popular United States produced program abroad is *Bonanza*. The best estimate of that program's weekly audience is 350 million persons in more than seventy countries. It is possible that no other television series has ever had—nor will have in the immediate future—such a large following. In second place in audience popularity is *Dr. Kildare,* which is seen in more than sixty countries. Documentaries are particularly well received by most foreign audiences. According to popularity polls, NBC documentary and educational programs, such as *Continental Classroom, Watch Mr. Wizard,* NBC News Specials, White Papers, and the *Wisdom* series are popular abroad. *Profiles in Courage* was an immediate success overseas.

Although shows that are slightly "de-Americanized" by including foreign locations are very popular overseas, the same shows frequently are not bought by stations in the countries in which they were filmed. Programs with a Japanese background are not always popular in that country. Japanese broadcasters apparently feel that American interpretation of the Japanese way of life will not appeal to their people. United States television producers must keep foreign social customs in mind when planning to distribute a series abroad. Sex, comedy, music, and action-adventure tailored for Americans are particular problems in shows sold to overseas broadcasters. Although dramas dealing with illegitimate children and social indiscretions often receive mixed acceptance in the United States and Australia, they are considered quite acceptable in the Scandinavian countries.

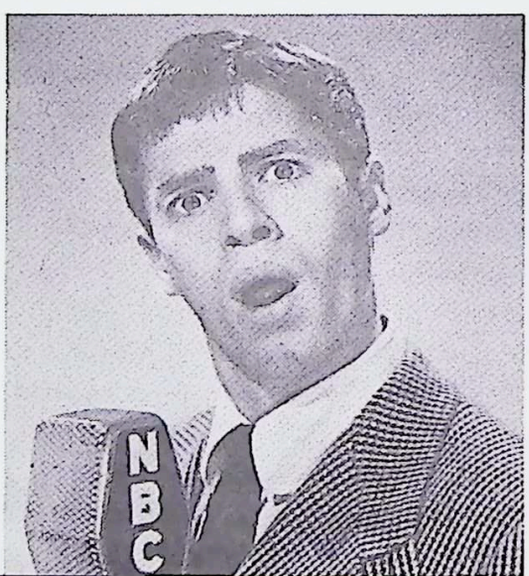
Subtle American humor sometimes gets lost in translation in programs broadcast in other countries. Even in Canada, however, American humor does not always make sense. Around the world, our political and satirical humor goes over about as big as a copy of *Punch* in a burlesque house. But, slapstick is universally understood and liked. A pie in the face is worth more to the foreign producer than a half-hour of classic Bob Hope one-liners on contemporary Americana. As in comedy, action is the key to success in foreign acceptance of dramas and adventure series. The sales records of hard-riding Westerns, action-packed war stories, hard-hitting detective shows, and sword-slashing adventure programs prove to United States producers that story lines must develop fast and characters should be muscular.

Music is not always the universal language. At least, American music does not always have the charm to soothe television audiences overseas. Although most Mexicans love *Hullabaloo* as much as do Americans, older people from many other countries are not as interested. But, teen-agers and the young-thinking set would not miss *Hullabaloo,* whatever their birthplace. Perry Como's smooth, effortless style is enjoyed by hundreds of thousands of people. But, In Italy, where the popular singers have gusto and force, his relaxed style has limited appeal.

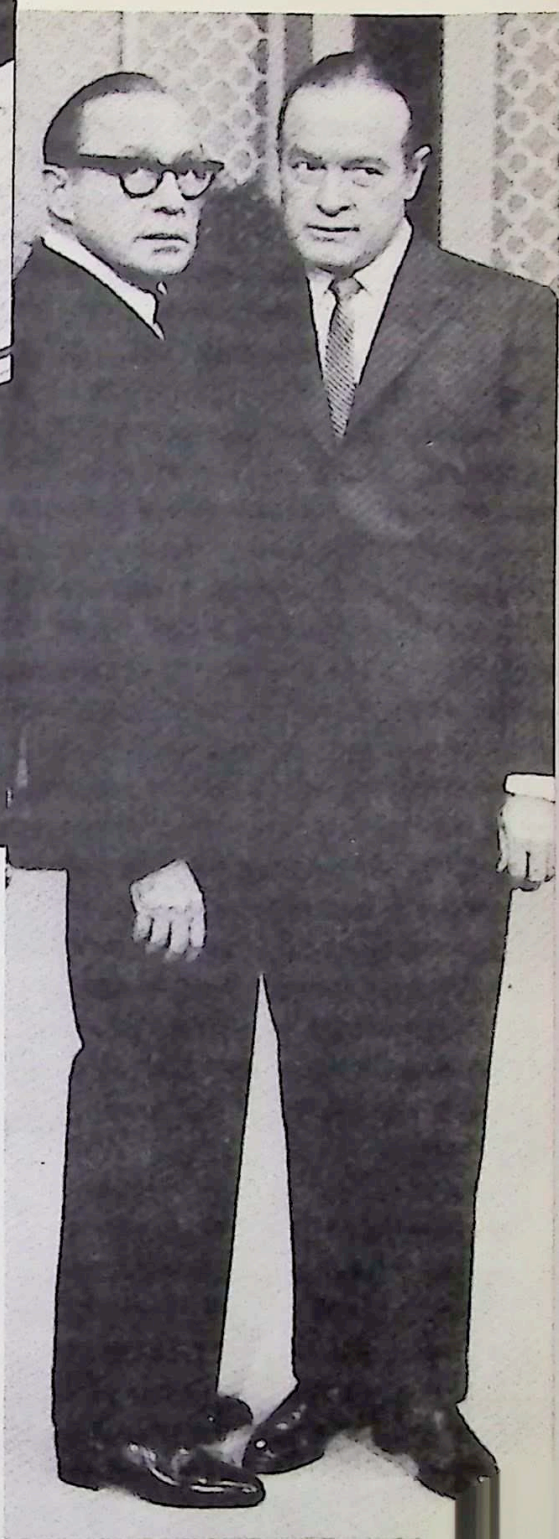
Germans enjoy both series and documentaries. For example, programs sold in Germany include such series as *Bonanza* and *Hullabaloo;* and such documentaries as *Who Shall Live?* about life-saving kidney machines, and *California the Most,* about life in the fast-growing, sun-fun state. In West Germany, there are two television networks, ARD and ZDF. Buying United States programs has become a specialized profession at ARD. One man buys the action-adventures, another buys the comedies. Far Eastern and African countries prefer entertainment programs to documentaries. Thousands of fan letters each month come from African countries to the stars of *Bonanza.* In Nigeria, some of the other popular programs are *The Deputy, Hennesey, Kentucky Jones,* and *Get Smart.* In Ethiopia, *Dr. Kildare* is in its third season. *Dr. Kildare* is also liked by the Japanese. Other shows seen in Japan include *Panic, I Spy, Victory at Sea, Michael Shayne,* and *Blue Angels.* Britons and other Commonwealth citizens will not accept the rough physical action that is seen in some United States shows. On the other hand, Australians like high-powered action and physical conflict. Outright brutality is not accepted by any foreign country, just as it is not accepted in the United States. Lately, some British television film producers have integrated rougher action in their series to attract United States program buyers. A traveler from the United States may feel bombarded with United States programing as he gallivants in other countries. Restaurants are named Bonanza, hotel doctors talk about Dr. Kildare, children play Laramie, and everyone is eager to talk about the American television show he saw the night before.

That "Wonderful World of Color" has been pretty much of an American world—up to now. But with the success of color in the United States, theoretical discussions in other countries are now beginning to give way to actual plans. The beginning of the decade of the 1960s saw only one country with regular color programing. By the mid-1960s, there were two. At the end of the decade, there may be as many as twenty. For years, color has been on the agenda of international telecommunications conferences, but most nations were far more concerned with building up

*"Duffy's Tavern" cast with Ed "Archie" Gardner (left, center). Ed Wynn (below, left). Jerry Lewis (right).*



*Charlie McCarthy and Edgar Bergen*



*Bob Hope and Marilyn Maxwell*

*Bob Hope (above) with James Cagney, Lucille Ball and Desi Arnaz. (Above, right) Bob Hope and Jack Benny. (Below) Bob Hope with (left to right) Artur Rubinstein, Blanche Thebom, Rosalind Russell and Dinah Shore.*

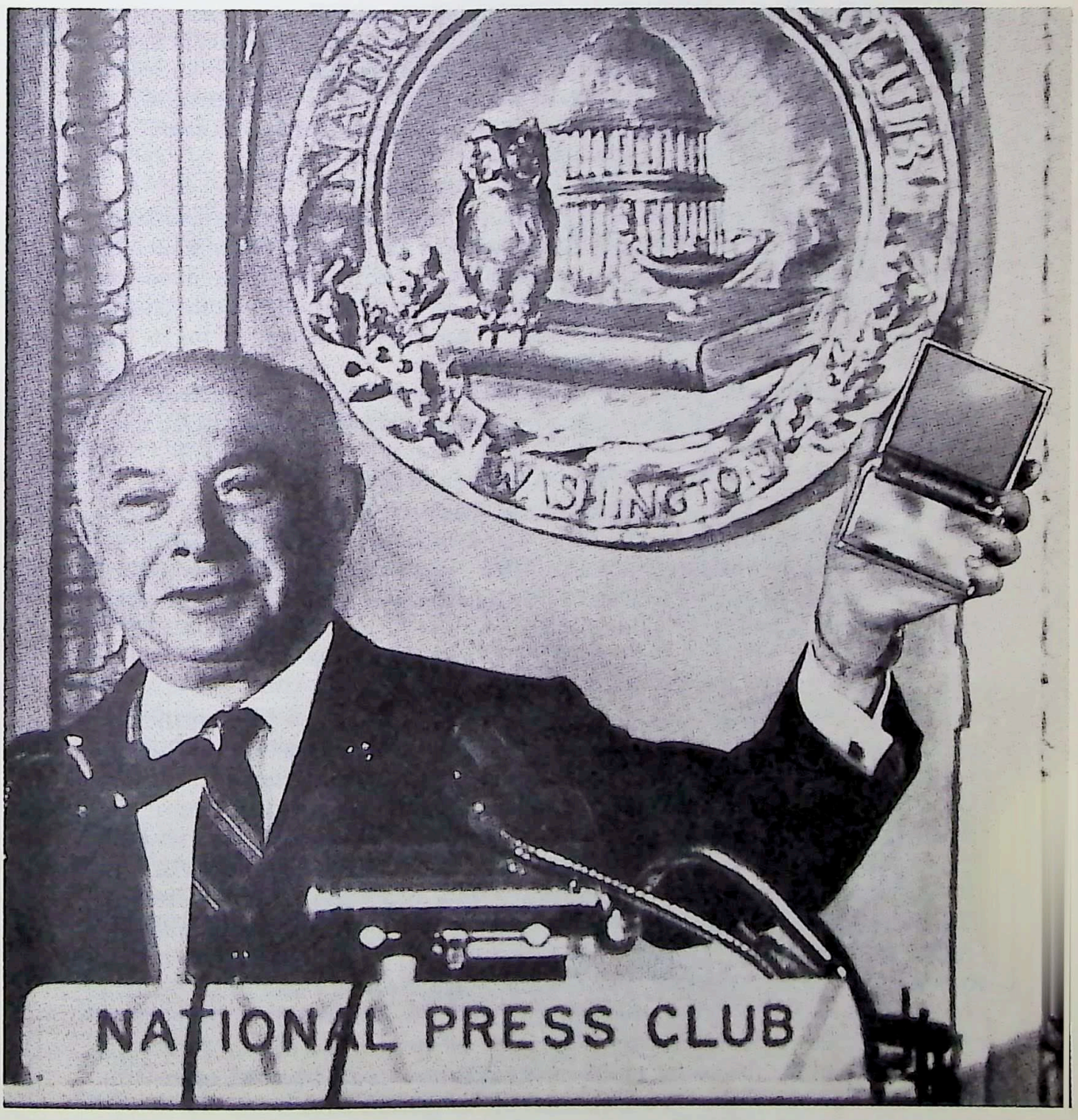
their black-and-white television services—and the record of color in the United States helped keep the discussions of this new service on a theoretical plane. Even in the most affluent country of the world, the growth of color television from 1954 to 1962 was hardly impressive, and foreign broadcasters—most of them supported solely by public taxation—were determined not to follow the same course. Since 1962, this gray picture has given way to a rainbow. Ten million color sets will soon be in use in this country, after five years of accelerating demand climaxed by sales of about five million sets in 1966. All nighttime network programing is now in color, and all of NBC-TV's programs—day and night—are tinted. The majority of stations are equipped to originate local non-network color.

In the United States, color television no longer belongs to the engineer, but to the public. As in the early days of black-and-white, this success has triggered a world-wide race, involving not only mass communications and entertainment but national prestige and international politics. American know-how and experience in the production of color equipment—particularly picture tubes—are becoming very important to European nations planning an early entry into color. There is little doubt that the standard American-type shadow-mask color tube also will become the standard in Europe, as it is in Canada and Japan. No other type of color tube, in fact, is in large-scale production anywhere in the world.

Thanks to American pioneering, other countries may have an easier time getting started in color. Spread over more than twelve years of operating experience have been improvements in every link of the color chain, from studio equipment to picture tubes to camera techniques. There need not even be an initial shortage of color program material, as there was in the United States. America, the world's largest supplier of television programs, has accumulated a huge backlog of color film and tape programs for foreign syndication, and this supply is growing daily. More than one hundred countries throughout the world now enjoy television. The exciting success of color in the United States has served to challenge and encourage the rest of the world to make firm plans to add this final dimension of realism.

*Lucille Ball, actress-comedienne, and the world's most successful female star, director, producer and film studio president in motion picture and television history. An eminent recipient of the Wisdom Award of Honor for her distinguished achievements, this "First Lady of Television" was one of the notable American women, along with Eleanor Roosevelt, who inspired and encouraged the creation and publication of Wisdom Magazine. No woman in the history of motion pictures and television has ever achieved the versatility, ingenuity, virtuosity and popularity of this world-famous and remarkably talented personality.*

# THE WISDOM OF SARNOFF ON *Radio and Television*




*General Sarnoff, at Washington's National Press Club, with a prototype of the pocket-size color television set of the 1970's, as envisioned by RCA's designers.*

The NBC organization, as it is now constituted, represents in my mind the best and most complete organization we have had since the advent of television. It is not easy to adjust an organization to meet rapid changes in the nature of the business, substantial growth and new problems, and to put the right men in the right spots. There are always trials and errors. But I believe that the NBC organization, viewed in the light of the growing business of the last few years and the many complex problems, now represents the strongest, best, most informed, most knowledgeable and the most professional organization that we could possibly find.

A problem I see facing the networks—and when I speak of networks I include stations as well—is the problem of films versus live programs. I do not regard myself as an expert in this area, able to predict the ultimate relationship of the two. It always has seemed to me there is room for both. I think there are times when films can be used profitably and successfully. And there are times when live programs are better.

I offer no objection to the use of films. But if the motion picture industry succeeds in making movie films dominant on television networks and stations, then American television broadcasting will become a national movie screen—just as some radio stations have become a phonograph. I think that would be a regrettable thing, not only for those of us in the business but especially for the American public. I do not believe, under such circumstances, it would be possible for networks to engage in the type of public service and quality programs they now offer the public free.

Another public service network program was announced recently in the field of education. It makes me proud that it was the NBC that offered it. I am particularly proud because the NBC in doing so, is following that character of development which to me has always symbolized the true meaning of radio and television.

I recognize the importance of ratings and I recognize the importance of popular programs. Yet, I personally have had my greatest satisfaction through putting the Metropolitan Opera on the air; through giving school children Walter Damrosch and his music appreciation hour for years; through persuading the president of Yale University, Dr. Angell, to join the NBC for ten years as the head of its Educational Department; through organizing the NBC Symphony Orchestra and inducing Maestro Toscanini to lead it for seventeen years. Such programs as the NBC-TV Opera in English, a great undertaking which met with tremendous success; such programs as "Wide Wide World" and "Peter Pan"; these are the type of live programs which I admire and which movie films cannot supply. And these are the type of programs which networks cannot undertake unless assured of a continuance of present operating practices, including a reasonable amount of option time.

From a short-range point of view it may be possible to make more money

with movie films than with live programs, although I doubt it. In any event, it's only a short-term solution. There is a limit to the movie supply in the vaults and it may take only two or three years to exhaust it. Beyond that, I doubt that films made twenty years ago are of very great stimulation to the rising generation. Some pictures are of lasting interest and we will always have room for them. But let us not make the television network and television station a national movie screen. If we do, all of us will have failed to carry out the great mission and the great challenge which lies before us.

I yield to no one in my enthusiasm for color television and my faith in its future. Many unfavorable things have been said about color but we have lived through that type of thing before. Remember when black-and-white television arrived? There were those who called us Televisionaries. There were those who said they would never produce black-and-white sets because television broadcasting could never be self-sustaining, and that revenue from advertisers would be insufficient to maintain it. But when the wagon was pushed uphill, and began to roll, plenty of them jumped on the wagon. And there were plenty that jumped on the color wagon when the going got easier. The RCA and the NBC are committed to a progressive program of color in all its phases, research, development, manufacturing, sales, broadcasting, programing.

I am not concerned with the relative merits of black and white versus color. That argument is academic, fortunately, because when you send out a color program, you send it out both in black and white and color. When you receive a program with a compatible color set you can receive it either in color or black and white. No one need be denied the privilege of choosing color or black and white. It seems to me that within the next few years people will no more think of buying the major television set in the house without color than they would think today of going to a silent movie. I believe most sets will be in color because you simply cannot show a rose in its natural color and do it in black and white. You cannot show a true tree, which God made in color, on a black-and-white screen. Color is the breath of excitement for a program structure that needs new excitement.

The NBC program organization contains the best minds and the most experienced people in television. While we will never sacrifice our dedication to quality programs, no matter what else happens, I also know this: We are dedicated to putting NBC on the top of the list in popular programs, as well as in quality programs. Whatever human ingenuity can do, whatever determined effort can do, whatever dedication can provide, the world will have from NBC.

Color television did not just happen. It overcame many obstacles before it reached its present position. And it is not yet at its final milepost. If we look back ten years from now upon the color structure as it exists today, we will not recognize it.

Color television is the basic entertainment medium of the future. On occasion, I have been asked whether I have ever harbored doubts about color television; whether I have ever wavered in my belief that it would make the grade. The answer is no. The reason is my personal knowledge of the historic pattern of product innovation.

When talking pictures arrived, the silent movie industry responded with an amused yawn. "Once the novelty wears off, they will disappear," it was said. "People go to a movie for peace, quiet and illusion—not for distracting sound." When black-and-white television emerged, many people in the movie industry gave it the contemptuous label of "that little peephole." Today motion picture companies are producing most of their films for television and frequently making more money from sales to television than from sales to theatres.

Color television was at first ignored, then it was harshly criticized. Today, it is an important growth factor in the American economy, supported by a swelling chorus of critical praise. Nobody asks any more: "Where are all the Texas oil millionaires who can afford color sets?" Nobody, fortunately, suggests any longer that "if you have a color set, you've almost got to have an engineer in the house."

Color is only at the take-off point. As I look ahead, I can foresee no limits in terms of technical progress and of programing advances. Continuing technological improvements in cameras, circuitry and tape recording will add important refinements to the quality of color television and to the scope of its programing. Man-made satellites already serve as relays for global television.

To create television in color "as red as any rose" was a gigantic task. When we first began to think of television in the early Twenties we would have been content if only the rose could have been televised in black-and-white. That miracle had no sooner been achieved when the eye, sensitive to color, observed that the rose in monochrome lacked its true beauty, and the cry went up for color. Never had scientists been put under such pressure and demand.

Once American vision, ingenuity and industry were applied to the task of developing television in color, tints began to appear on television screens in the laboratories. To televise an apple and have it appear as an apple was problem enough. But to televise a pretty girl—the true color of her hair, eyes, lips and facial features—added to the complexity of the task. And then to capture in motion a toss of the head, a wink, a smile, and add the sound of the voice—seemed like asking for the impossible.

The word "impossible" is not to be found in the vocabulary of the scien-

tist. Color television will be recorded in the history of the Twentieth Century as one of the greatest, if not the greatest, of man's triumphs in linking science with the arts in the full glory of nature. Flowers and flags, birds and beauties are televised in color. Sunrises and sunsets, the rainbow, and even the sky which Ruskin described as "not blue color merely, but blue fire that could not be painted," are televised in color.

Color follows light to which radio and television are akin. The electronic camera scans a simple garden scene, an array of flowers or an oak in its copper-hued autumn garb. In the twinkling of an eye the television transmitter transforms the picture into invisible waves that are broadcast to all points of the compass. Antennas atop millions of homes pluck the pictorial waves from space and guide them in the form of electricity to the television receiving set. At the flick of a switch or the turn of a dial, the scene reappears on the screen exactly as the camera "eye" saw it many miles away. To perform this split-second magic with true fidelity to colors and make realistic by every sound in the original scene—even the rustle of the wind or the buzz of a bee—is the miracle of color television.

It is now comparatively easy to colorcast such spectacles as Niagara, the skyline of New York and the panorama of the Golden Gate. Baseball and football, prize fights and parades, drama and opera all fit into the pattern of progress. It has been my privilege, and a fascinating experience, to watch the scientists at work in color. I marvel at their accomplishment in bringing into focus the principles of radio, optics, electronics, photography, chemistry and many other essentials so that they might all work together to make color television practical.

For many years I watched the research men and scientists pioneer and develop this new science and art in RCA Laboratories. Talented engineers, who created the compatible, all-electronic color television system and the famed color tube. They have added a new dimension to the entertainment arts. They have given a new power to advertising and to merchandising. They have added realism to journalism and have intensified television as a social and educational force, opening the way for significant advances in television service to the public. Color television has marshalled a great corps of experts from practically all fields of science. Many of them already had achieved fame and world-wide recognition in developing the RCA black-and-white television system. As I watch the results of their genius on the color screen, I often wonder if they, too, sit back and view with amazement and pride their successful emulation of nature.

The creation of the RCA compatible color system translated the earlier miracle of television itself into a vivid and revolutionary dimension of untold promise for the future of human understanding and enjoyment. In the creation of color television, science has endowed us with a priceless gift. The glory and reality of nature, the inspired expression of master artists and musicians, the full drama and excitement of human affairs

may now speed with the swiftness of light into the homes of men. In the years that lie ahead there will be growth and adaptation in this art, and ultimately a system of color television that will extend across the oceans, bringing all peoples together in the common appreciation of their varied ways. It may well be that we have brought to birth in all its essentials the ultimate in human communications—a deeply significant force which may ultimately dissipate the tensions among men and inspire mutual understanding and respect.

When radio broadcasting came along, the phonograph companies said, "People want music when they want it. They'll never be content with any selections that radio stations put on. Broadcasting will never succeed." Not only has broadcasting succeeded, but more phonograph records by the millions are being sold today than were ever sold before broadcasting was established.

When I first visualized the home radio receiver in 1915—years before it became a household reality—I called it a "music box." And ever since, I have thought of it first of all as a "music box." Such contributions as I have myself been privileged to make to radio programing have been primarily on the musical side, as symbolized by great names like Walter Damrosch, the Metropolitan Opera, Arturo Toscanini and the NBC Symphony Orchestra. Certainly those are the kind of contributions that have brought me the greatest measure of inner satisfaction.

Before television could be achieved we had to collect much knowledge regarding not only radio and electronics, but wave propagation and optics in order to develop the necessary electron tubes, cameras and all sorts of new devices. Today, we are likely to think of television substantially from an entertainment viewpoint. This, of course, is natural since television is an electronic brother of radio broadcasting. Nevertheless, television has many applications outside the realm of broadcasting. It is destined to have a great impact on other industries and, at the same time, help to create new industries.

International television has become a powerful aid socially, educationally, and politically. If properly used, it can cultivate better understanding among nations and help to reduce the tensions born of misunderstanding. Television's performance vividly illustrates the old saying that: "Seeing is Believing." And the Talmud says "There is no comparison between Hearing and Seeing." It requires no stretch of the imagination to envisage other uses for such a great medium as television. Wherever the application of sight comes into use, television finds new challenges. Combined with other branches of electronics, television already is moving into new fields.

I am keenly conscious of the significant part played by music and musicians in the growth of the radio industry with which I have been

associated for sixty years. Preferences and fads in radio and television programs may come and go; but music remains the basic, the indispensable ingredient.

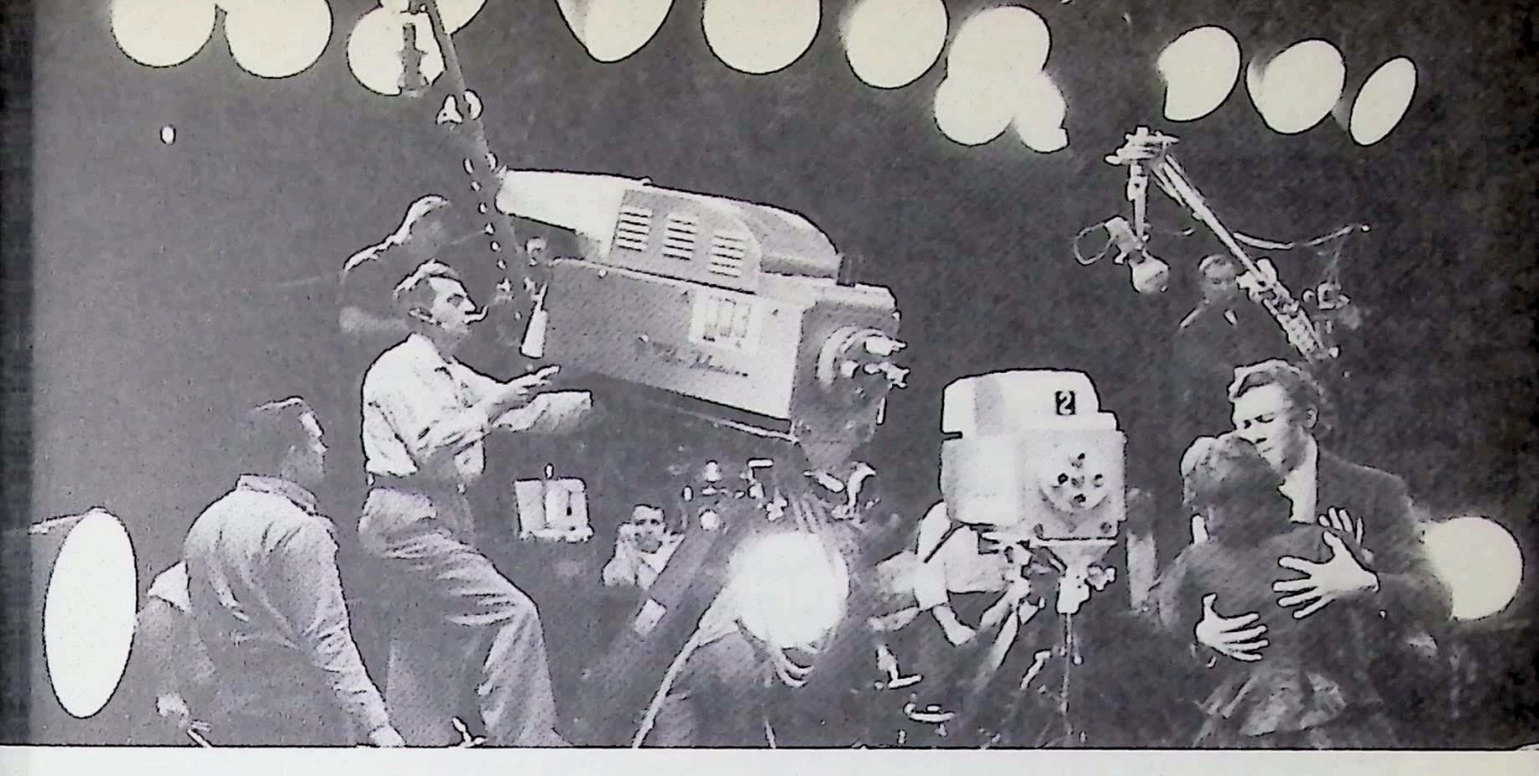
America is a nation of music lovers. Perhaps I may modestly claim that radio and television have contributed to an increased appreciation of good music on the part of Americans. We have some of the world's finest orchestras, bands and ensembles. More and more communities support their own symphony orchestras and provide large audiences for visiting musicians and singers. For more than forty-seven years our people have been able to tune in on the world's greatest music presented by the foremost artists. By this time they not only recognize but actually enjoy the great works of American and European composers and masters of music.

Radio and television have provided American business with the most effective channels yet devised for bringing its products and services and philosophy to the entire consuming public. Business, in turn, has provided broadcasters with the financial sinews to maintain their program service to the public and, no less important, to do the prodigious job of continuous research so indispensable in this field. Such is the simple economic equation of broadcasting in this country. It has worked amazingly well. I am convinced that the dimensions and the immense vitality of the industry—measured in terms of the benefits it has yielded to the American people—can be credited primarily to this American system.

Because in our way of life we cherish and emphasize competition, we are apt to forget the far-reaching role played by cooperation. Yet the radio-television industry is a significant example of the kind of teamwork characteristic of a free economy. In many ways, indeed, it is a unique industry, because of the interdependence of so many independent elements and functions. Here, it would seem, production and advertising, science and the arts, invention and engineering, private incentive and public service, meet and merge to a larger degree than in any other area of endeavor. Rarely have the currents of our national life blended so effectively to produce beneficent results in so short a time as in radio and television.

Because the airwaves we use are a great national resource, we have a Federal Communications Commission whose members must constantly assay crucial questions and decide among conflicting viewpoints—always with "public interest, convenience and necessity" as their divining rod. I have not always agreed with their conclusions. But I have always recognized the dimensions of their task, as well as the sincerity and devotion they bring to it. They carry a great responsibility and are entitled to the fullest measure of our cooperation.

Whether we are broadcasters, advertisers, or government officials, radio-



*The NBC television color production of "The Barretts of Wimpole Street," the love story of Elizabeth Barrett and the English poet Robert Browning. (Left) The immensely successful English novelist and playwright, W. Somerset Maugham, one of the truly great immortals of world literature, as he appeared on the NBC-TV Wisdom Series.*

Through his notable contributions to the creation and development of television, David Sarnoff has given to the world a fascinating avenue to the glory of the World's Great Literature. To the delight of mankind, this exceptionally cultivated man of rare intellect has beautifully put together literature and television for the nourishment of our youth and the joy of our old age. Through television he has given to the lovers of great novels a pleasure which arises from a visual experience wider in scope and far more objective than books can give. He has recreated the world of literature for us through NBC television productions, and has given us a tremendous range of experience, as well as fresh impressions of the literary masterpieces, like a new revelation.

Through the exuberance of color television, we recapture the charm of olden times and faraway places. We meet the great characters of literature in our own homes and see these great characters in the setting of their times—social life, costumes and architectural background—as created by the greatest authors of fiction. It is not only from the things said on television, but from the way in which they are said, the way characters look, move about, do things, talk to one another, live their lives—that make the legendary characters of fiction real to us as actual people. Through the superb language and highly individual style of television, the literature of the ages and events of history have come alive with sweep, magnificence and refreshing vigor.

David Sarnoff seems to have lived in close touch with all mankind, for he has indeed opened to countless millions everywhere the world of imagination and the workings of the human mind and heart. He has renewed and regenerated the cultural riches of great novels with a pictorial power and colorful splendor that dazzles human eyes. He has popularized the spirit of literature and has given it beauty, inspiration and enduring interest. He has widened our horizons, deepened our sympathies and has given us a deep insight into the lives, thoughts and ideals of great authors. To David Sarnoff—to this intellectual giant of our age, this incomparable virtuoso of momentous talents and high imaginative power—the world will forever be deeply indebted.

W. Somerset Maugham

W. SOMERSET MAUGHAM
*Author, Novelist and Playwright*

television is our special concern. But it decidedly is not our exclusive concern. Every American family has a direct stake in its operation. We know that the final test of our combined efforts and decisions is not in our reports and ledgers—it is in the American home.

We hear a good deal these days, and are likely to hear more, about the relative merits of free television and fee television. I was among those who fought the selfsame fight when broadcasting was a fledgling effort. So I naturally have strong convictions in the matter. It does seem to me that when all is said and done, it is the American people who should constitute the judge and jury. The ultimate decision, for good or ill, will have a direct impact upon their everyday life, their economy, their culture. I do not think I am exaggerating when I suggest that the issue is as important to our entire citizenry as was, for example, prohibition in its time. I feel justified in proposing therefore that it be submitted to the ultimate suffrage of public opinion—a suffrage based not on guesswork, slogans or prejudices, but on wider knowledge and understanding of all the facts.

Through the magic of radio, all the world has been brought within range of man's hearing. Through television, all the world will be brought within range of his sight. Before long, I feel confident, we shall look clear around this globe as easily as we now talk around it by radio.

The genius of many nations has entered into the twentieth century miracle of television, but our America seized leadership at an early stage and has maintained it consistently ever since. If we are to fortify our free system of communications, we must strengthen its framework, the structural elements of which are stations and networks. Here, again, the unique interdependence of the radio-television industry finds expression. The stations, supplementing local programs with network offerings, build an audience that attracts national advertisers. The networks, in turn, provide the national program service that is, in effect, the carrier for the advertising message. Without this blending of functions, neither the audience nor the advertisers would enjoy the full benefits of our great nation-wide broadcasting service.

Radio broadcasting did not obsolete the older phonograph industry. Nor has television meant the death of the movies. On the contrary, by forcing motion picture leaders to explore new techniques, television may in the long run prove a blessing in disguise for the elder art.

There is now surgical television. A camera and microphone suspended over an operating table enables large groups of doctors, nurses, internes and students to have a close-up view of an operation. In this way television becomes extremely valuable in medical training. A prominent surgeon who watched one of these demonstrations remarked, "This is a teaching medium that surpasses anything we have had in the past—I

never imagined television could be so effective until I actually saw it. It may well prove to be the Medical Lecture Hall of the future."

Television is playing a part in the war against disease. Until recently scientists found it difficult to keep microbes alive for study—at high magnification—in light microscopes. Dyes used to make them visible killed some and others were destroyed by the intense light. Our scientists have solved this problem by making television a working partner of the microscope. The "eye" of their new system is a small television camera built around the sensitive vidicon tube. No intense light is needed, since this electron tube "sees" at low light levels. And by making the tube sensitive to the red or violet bands of the spectrum, dyes and stains are eliminated. With this new system, research men are able to watch living germs or cells—immensely magnified—on the screen of a television set. Students can be more easily trained. And, of course, scientists and medical experts learn more about disease by watching live micro-organisms.

Change is a natural and basic element in this industry. The "big change" in television, of course, is the addition of color. And the swing to color is gaining momentum. It is certain to exert a great impact on the American home and the nation's economy. Life, as we know it, is never a monochrome but a symphony of color tones—and that, in the long run, is how the viewer will want it portrayed now that it has become technically possible. Man, apparently, has a natural hunger for variety in color, just as he has a natural craving for variety of taste in food. Think of your own home suddenly drained of all color and you will realize why this is so. What is a gorgeous sunset or a rose drained of all color? What is a human face without the infinite play of color in the eyes, the skin, the lips, the hair? If black-and-white is the body of beauty, color is its soul. That is why we dedicated ourselves years ago, despite the enormous investments involved, to the task of adding color to sight. That is why during the past year we have spent millions to produce and broadcast color "Spectaculars." Great and gay will be the color cavalcade this season and, through the fine color sets now on the market, Americans in ever increasing numbers will enjoy it.

The public is becoming more color conscious right down the line. If you have any doubt on that score, look at the peacock hues of the latest automobile models. Look how the average kitchen and playroom is breaking out in rainbow pigments. Look at the reds and blues, the greens and yellows of the new containers in which so many long familiar products are now being offered. On their display floors and store shelves, merchandisers are compelling attention for their cars, kitchen equipment, and endless other goods which heretofore were sparing in the use of color. A revolution in packaging is also under way—business is calling upon artists, color experts and lighting specialists to pace this revolution. Only recently a leading cigaret manufacturer announced a new color package, brightened and more attractive, so that it would appeal to color television audiences. More and more, the wrapper of gum or candy, a cereal box,

a coffee can, a tube of tooth-paste, will be designed with an eye to the power of television to convey color to perfection. Virtually every product will increasingly be recognized and sold by its distinctive color combinations. The human eye, after all, has been created to behold, appreciate and discriminate colors in every phase of life. Color is to vision what melody is to sound.

My experience has convinced me that broadcasting does not exist merely to enable manufacturers to sell receiving sets, or broadcasters to earn a return on their investment, or advertising agencies to earn a commission. I certainly do not disparage these necessary economic realities, but I know that they are not the whole story. Neither, for that matter, does broadcasting exist solely to provide free entertainment for the public, important as this function obviously is.

Radio-television happens to be an industry and an art whose power for affecting life in all its diversity is almost incalculable. That power implies responsibility, in terms of improving and enriching the nation's life. Under the surface of our busy affairs on the commercial level, we are also engaged in helping to shape contemporary civilization. In the long run those in the industry who do not take cognizance of this deeper purpose will not survive in this field.

It is well for all in the industry, and those utilizing its facilities, to keep clearly in mind at all times the potential for good and evil at our disposal. We must regard it as a public trust—not merely another business. Radio and television are wonderworking instruments in our hands. We must dedicate ourselves to using them well and wisely.

Television didn't just happen. It was created through continuous and costly research and development by a few large companies. The road they traversed was long and sometimes discouraging. But they were willing to back their faith with their resources. I am proud that RCA—which has put millions into the development of black-and-white television and many more millions into color—was one of these companies. The tremendous efforts and unflagging faith of these few large companies have produced a new industry. Already that industry supports hundreds of competing manufacturers—large and small—and a multitude of related enterprises. And this industry is only on the threshold of its destiny.

No industry is an end in itself. It is an instrumentality for public service. Television's job is to bring the best programs to the most people throughout the country and ultimately throughout the world.

The pioneers of the screen created a new art of showmanship, developed magnificent talents, and built a fabulous industry. They brought to the

screen not only glamorous figures from life, but also glamorous words from the dictionary. "Colossal" is one of these—a Hollywood understatement, as someone has said. Many of their achievements have been truly "colossal"—and so were some of their failures. But success or failure, in black-and-white or color, they paint their pictures in broad strokes, with a big brush on a wide canvas. Television, also, is a picture in motion. It has grown to its present size and scope in far less time than its predecessor required to reach a corresponding status. For this, in part at least, television must acknowledge its debt to the movies.

With all its impressive power, television is still a youngster. It has made some mistakes—none of them fatal—and has repeated some of the mistakes of its elders. But now it is big enough to accept responsibility for its own shortcomings. So I say to my many friends in the motion picture world: Television can learn much from you, but there is also a good deal it must learn to forget. The essential differences between television and the movies may be temporarily blurred by the similarities between them—but those differences are very real. For example, television has no box office and no theatre to which people go and pay for the privilege of seeing the show. Its audience is as wide as America. It is composed of millions of small groups—the family circle in the intimacy of its home. There, they select what they want from the variety of offerings always available. They exercise the right to look at and listen to whatever they permit to enter their home over channels that are free and belong to all the people.

Audiences in the home and audiences in the theatre are quite different human entities. They will not long be satisfied with the same fare. They will expect, and rightly so, something in the theatre unlike what they can tap at home—and vice versa. This is all to the good. For it means that there is need for both types of offering. To satisfy this dual need calls for imagination, artistic enterprise and open-minded experimentation in the motion picture theatre and the television home alike. I am not envious of the resources of Hollywood's motion picture studios or the box office. I am convinced that television broadcasting, like radio broadcasting, can solve its economic problems without a cash box in the home.

The ultimate test of movies, radio and television, is the value of their programs and the public interest they command. The program content of radio and television broadcasting is far more varied than in any other medium. It has to be, because its vast audience has an endless diversity of taste and interest. Broadcasting embraces all the varying forms of entertainment that have delighted mortal man through the ages. But it goes beyond entertainment to satisfy a whole spectrum of human cravings for information, education and spiritual consolation.

As we listen to radio and watch television, we hear and see fine programs in every category. We also find some that are mediocre, or worse. Artistic

perfection is not easily achieved, but it must be the constant goal. Critics —and their strictures are sometimes justified—do not always recognize that broadcasters must meet varying tastes and interests. Neither conventional entertainment nor the press, for instance, is called upon to change its content every fifteen or thirty minutes for about twenty hours a day 365 days a year. A single movie or play may fill a theatre for weeks, or months, or years. But the appetite of broadcasting for ever new, ever fresh fare is insatiable. No other medium is expected to cater both to the masses and the classes over the same facilities.

The thousands of programs of infinite variety presented each month are the products of hundreds of performers, writers, directors and producers with abilities and talents of every degree. To demand absolute perfection is to demand a miracle. Yet we must ever set our sights high. Our effort must aim to avoid the easy road that leads to programing by formula—the road to sterility. In the last analysis, the audience is the judge and it will not remain supine under a barrage of programs that grow stale. The need for originality is particularly important in a new and voracious medium such as television. This calls for new ideas and techniques, that will ultimately lead to the development of its own art forms suitable for the intimacy of its appeal and within reasonable costs.

The maintenance of high standards of taste in programs brought into the family circle is vital because of the compelling impact of radio and television. Of course, this involves human judgments which vary from individual to individual. I know of no one who has a divine right to a final verdict on what is good for the public. The people's franchise in choosing what it will appreciate and enjoy cannot be canceled out by self-appointed monitors. And after all, the ratings show that the popular programs—precisely those that some opinion makers frown upon—have the largest circulation and the steadiest sponsorship.

I believe that the radio-television industry has demonstrated that it can arrive at reasonable, common sense judgments which rule out the vulgar and the offensive without impairing artistic effectiveness. Advertisers have recognized that a message presented with tact and in good taste will win more customers and good will than blatant commercials or claims exaggerated to the point of irritation. All broadcasters are conscious of the problem. Most of them are meeting it with energy and intelligence.

The public has a responsibility in their choice of radio and television programs. After all, it is under no more constraint to patronize so-called popular programs than it is to buy popular magazines on the newsstand. It has the same breadth of choice on radio or television that it has in deciding between a slapstick comedy and a great drama on theatre row in its community. There are plenty of high-grade programs on the air to suit the most meticulous tastes—opera, concerts, plays, political forums, and so on. Do these selective customers always exercise the

same thoughtful selectivity when they turn a radio or television dial at home that they do in plunking down the price of a ticket outside the home?

The public has a share in fashioning programs. If enough people practice selective listening and viewing, they will encourage the trend toward more sponsorship of the finest cultural and informational programs. Stations themselves can strike a balance between immediate profit interest and long-range permanent public interest. They must see the importance of providing programs of great public value, even if immediate sponsorship is not available. I do not imply that all sustainers are good and all commercials bad. Often it is the other way around. I merely want to say that the immediate profit-and-loss statement cannot be the sole governing factor in an industry dedicated to serving the public.

Broadcasting is a dynamic and changing enterprise. It goes through cycles of development and adaptation. It reaches plateaus, then surges to higher levels of service. The industry is now in the throes of one of these great cycles of transition to a higher level. Although the problems of transition are large, the prospects are correspondingly promising. We have in radio a very flexible, inexpensive medium with powers of resilience and adjustment greater than some may realize. We have in television an unparalleled communications system which has become an indispensable tool of American salesmanship and a major influence in American life. The public wants both radio and television. It will use each of them to the extent that it serves and satisfies the public interest. Our economy needs both mediums, and it is big enough to support both, provided they will conscientiously meet its requirements for effective and economical advertising.

Radio has extended our sense of hearing and carried our voice clear around the globe. Radar has plucked echoes from the moon. Television has projected our sense of sight across continents and spanned the oceans as well. The glorious panoply of full color has been added to this extended vision. Folk dances in the gorgeous colors of their costuming and setting, masterpieces of painting in far-off galleries, dramas written by great authors and played by great actors, have been brought into our living rooms. The sights and sounds of the whole world, its great events and teeming beauties, are becoming accessible to almost anyone, anywhere.

I think the time will be here, and before very long, when a broadcaster will no more consider broadcasting a program in black-and-white only, than a motion picture producer would today consider showing a film with motion only and without sound. After all, if you broadcast in color, the viewer in his home can decide for himself whether he wants to see the program in color or in black-and-white. With the compatible system the same set enables him to do either, by merely turning a knob. But if you broadcast in black-and-white only, then, of course, the viewer can't see it in color, he can only see it in black-and-white. So, it seems

to me that the question of whether it should be broadcast in color or in black-and-white, answers itself; except for economics. With further experience and simplification of apparatus, the additional cost of broadcasting in color will, in my opinion, not be enough to justify the transmission of programs in black-and-white only.

In the cooperative relationship of radio, television, press and motion pictures, we find an excellent example of how each contributes to the other, and the total effort becomes one of progress in greater service to the public. The press associations supply news to the broadcasters just as broadcasters often given historic news to the press. On the television news broadcasts the public sees the events brought to life, which they have read in the press or heard over the radio.

The eye is the most curious organ of the human machine. We almost always want to see things. We may not always want to hear things, but we certainly want to see them. Television has removed the blinders from man's eyes and has enabled him to look beyond the four walls of his own home, almost around the globe. International television is here today just as certain as international radio. So, it is impossible to place limits on the utility of television, its potentialities and its value to mankind.

Television has made it possible for man to see what goes on elsewhere without having to go there bodily to witness the objects of his interest. That is a great boon to mankind. And it is a great field of endeavor to be engaged in, especially for the younger men and women who are now entering the field of color television with its promising future before them.

In those nations of the Open World where free thought and the right to disagree prevail, television has become a powerful communications anvil upon which men hammer out and temper new ideas and new concepts. In nations of the Closed World, such as Russia, it has become the most effective means of foreclosing new ideas and insuring doctrinal conformity.

Regardless of whom it serves, television has become a vital part of the world-wide struggle for the possession of men's minds. And the ultimate victor in this fateful communication contest might soon be resolved, for television has been installed in most of the countries of the world, with some systems state-controlled, some privately owned and some a fusion of both.

A few years hence—if foreign growth continues—there will be television stations in virtually every nation on earth. An audience of a billion people might then be watching the same program at the same time, with simultaneous translation techniques making it understandable to all. In a world where nearly half of the population is illiterate or semi-

literate, no other means of mass communication could equal television's reach and impact upon the human mind.

Global television as a channel for freedom will be shackled unless we plan some radically new approaches for its use. If it offers a bright new promise for moving the world closer to civilized harmony, then presidents, prime ministers, leaders of every political, religious and intellectual persuasion should commence, with urgency, an evaluation of its potentialities for advancing world peace. Such evaluations should not be based on the conventional concepts of international programing. It is, of course, wonderful to view a live performance of the La Scala opera in New York or Capetown or Anchorage; or watch, in your home, a Mozart Festival from Salzburg—in glorious color. But it is in the informational and political sphere that we must find programs which will anchor, at the earliest possible time, the concept of free international usage.

The employment of global satellite television as a new channel of communication among Heads of State would make it possible to conduct summit conferences in which the principals would confer face-to-face without leaving their capitals. They would discuss the issues of great moment by employing television in the same way telephone conference calls are handled domestically today. We can visualize each national leader sitting in his television-equipped office—in London, Paris, Bonn, Moscow, Washington, or elsewhere. A television camera trained on each man will relay his image to all the others for viewing on a split-screen or on multiple screens. In addition to conversing back and forth, each will be able to display charts or diagrams, or even films, relating to the questions on the prearranged agenda and he will see those which any of his confrerees wish to project.

With a satellite system of communications, when closed sessions are desired, the television transmissions could be scrambled and decoded by special equipment at each capital, using the same security techniques now widely employed in military and some commercial communications. When there was no need for secrecy, the conferences could be available for all to see and hear. With people everywhere riveted to the television screen, the leader of a Closed Nation might well think twice before blacking out his own country from an event of such magnitude—and one in which he himself participated.

Over the years I have suggested on several occasions to the United Nations that its membership, by resolution, establish the principle of "Freedom to Listen and Freedom to Look," and that it provide itself with facilities to broadcast its public proceedings and its pronouncements, with the aim of reaching people everywhere regardless of race, creed, color, or political philosophy. America is in a position to offer dramatic new support for that principle by enlisting global television in the service of the world community. Specifically, we can do so by making available a satellite communications system television channel for use by the

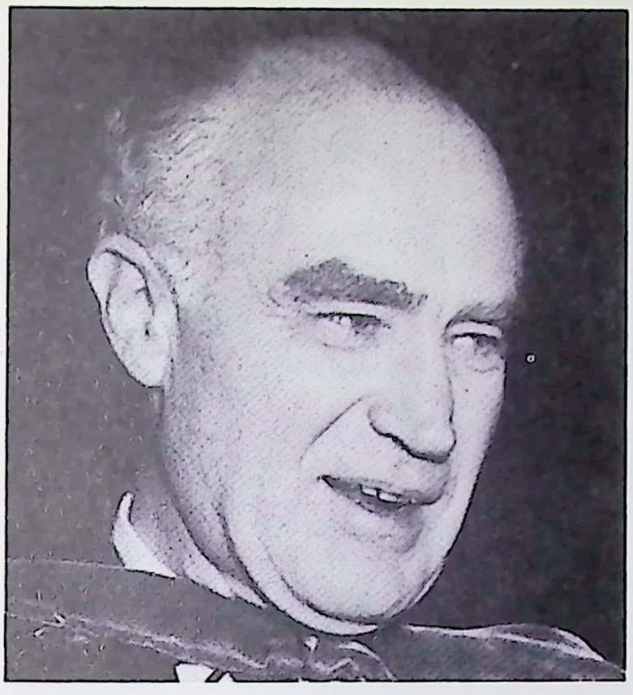
United Nations. Such an offer should have no strings attached. The United Nations should provide its own studio facilities and staff and be master of its own programing content, just as privately owned networks and stations are in America. However, I suggest that its most useful programs would be its own deliberations: The Security Council at moments of urgent discussion, the Assembly in deliberation on fateful questions. It would not always be a placid picture that humanity viewed, for world political discussions are seldom constrained. But, contentious or pleasing, it would be life as it is mirrored in the only existing world forum where ideas are publicly exchanged and debated.

If the United Nations energetically and successfully seeks the use of its own channel to bring the world its own deliberations, then freedom might follow in the wake of television. It is more than a truism that when people are exposed to the clash of ideas, they seek to sample the process. In its simplest definition, this is freedom.

The poet Archibald MacLeish did not know of satellite television when he said, "Our technology, wiser than we, have given us the unforeseen and unforeseeable means of world-wide understanding at the moment when world-wide understanding is the only possible means of lasting peace." To carry his allegory one step further, I suggest that global television can be a beacon for lighting freedom's pathway to those who still grope in the political dark. And that same beacon can also help to safeguard the integrity of the United Nations itself. It can illuminate for people everywhere the real character of political campaigns, such as the Soviet Union wages today, which are intended to destroy the United Nations as a force for stability and peace in a world that needs both.

No advance of the human species ever comes easily, nor will the proper application of global television. If it is to compress the world in the service of free thought, we must use it boldly and forthrightly, and we must not recoil from aiming it against ideological barriers.

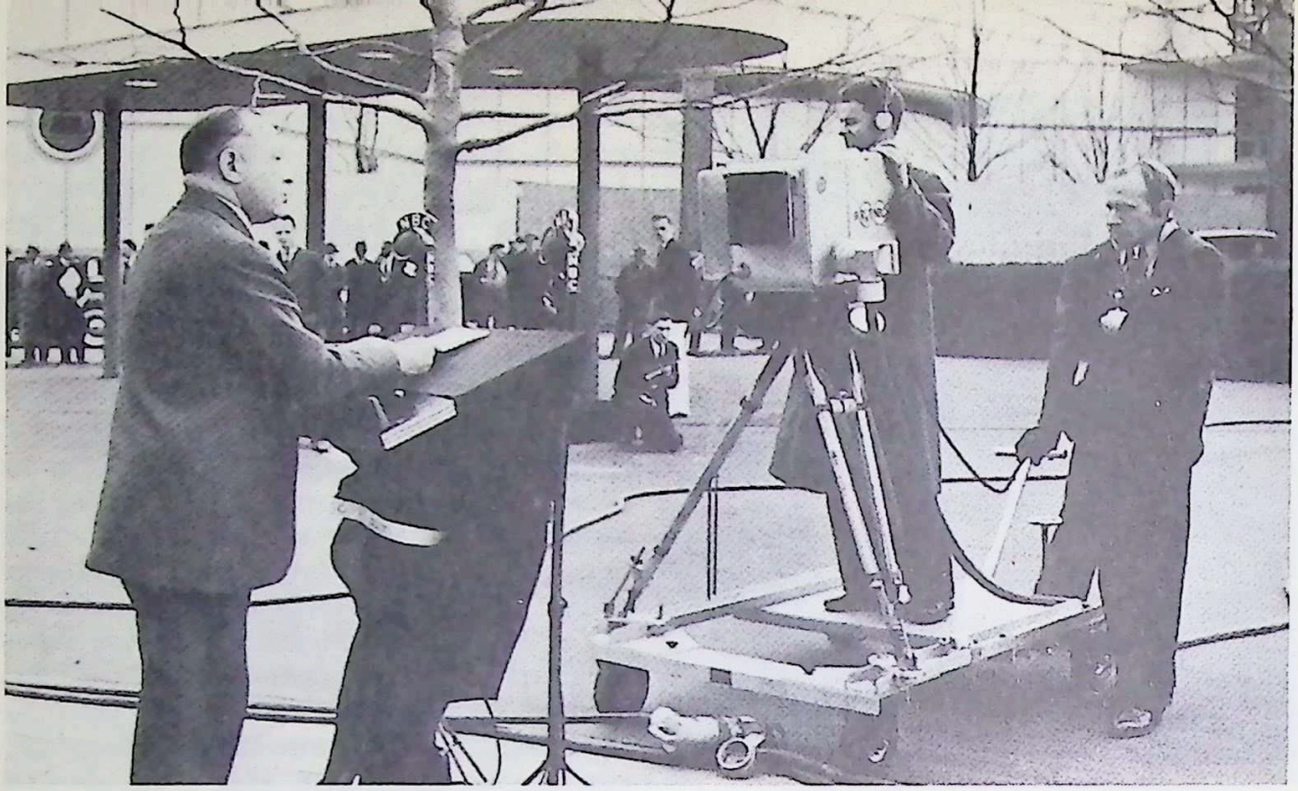
*William Benton, publisher and chairman of Encyclopaedia Britannica, is also head of EB Films, the leading American producer of classroom motion pictures, which is offering the NBC-Television Wisdom Series to schools, colleges and universities. The Wisdom Series presents the world's foremost doers and greatest thinkers who have played major roles in shaping the ideas, events and future courses of our world society. These filmed conversations of wisdom cover a wide range of subjects, and the variety of uses in modern education to which these films can be put is virtually unlimited. An eminent recipient of the Wisdom Award of Honor, Benton collaborated with the Editors of Wisdom Magazine on a special edition which was devoted to his wisdom and published in tribute to his distinguished achievements in education.*



HENRY R. LUCE
*Founder, Editor and Publisher*
*Time, Life, Fortune Magazines*

General David Sarnoff is undoubtedly one of the most celebrated and useful Americans of our time. He has served America long and faithfully, and has made the entire human race his debtor. Fortunately for humanity, he believes that life is a gift of God to be used in trust for the greater happiness of all men. Through radio, television and electronics he has revolutionized our life and civilization so that the world would seem a very dull place for us if we had to get along without them. His intellectual honesty in meeting the great problems of our age in fearless discussion is worthy of the highest appreciation. He has aided mightily the progress of his fellows. Today, General Sarnoff is still laboring to enlarge the frontiers of life. His perseverance is boundless. His mind seethes with ideas and problems. He has a prodigious energy, and a kindly, unselfish, earnest way of seeing the good of others. Added to these, he retains the enthusiasm of youth. Nothing seems impossible to him. He is the incarnation of th American genius for inventiveness.

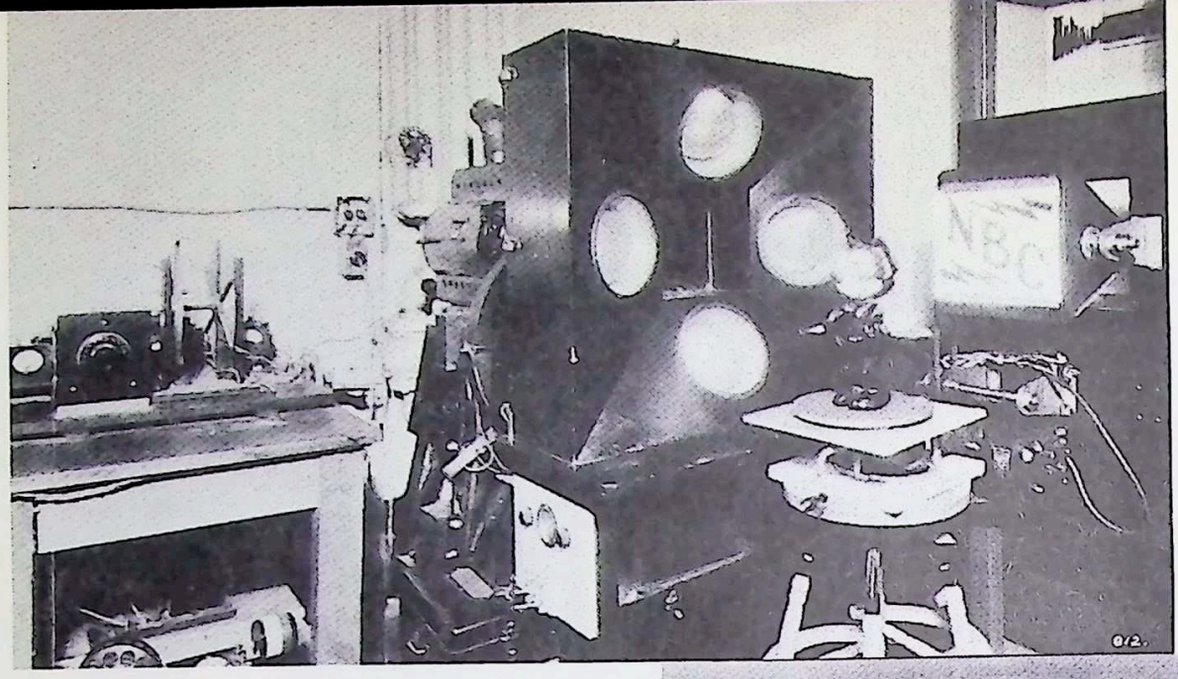
*Henry R. Luce (right), Founder, Editor and Publisher of Time, Life and Fortune Magazines, and renowned as the greatest and most successful magazine publishing genius in world history, is shown here with Leon Gutterman, Founder, Editor and Publisher of Wisdom Magazine, Wisdom Books and the Wisdom Encyclopedia. Luce, an eminent recipient of the Wisdom Award of Honor, was the first notable American to inspire and encourage Gutterman to create and publish Wisdom, a distinguished magazine that is devoted to the advancement of knowledge, learning and research in education, and dedicated to the highest aspirations of the human mind and spirit.*



*Historic telecast of David Sarnoff. Standing before the television camera and microphone at the New York World's Fair in 1939, General Sarnoff introduced television service in America and launched a new industry. Below, as he appeared on television receivers. He said, "We now add sight to sound! It is with a feeling of humbleness that I come to this moment of announcing a new art so important in its implications that it is bound to affect all society. Television is a creative force which we must learn to utilize for the benefit of all mankind." As early as 1923, in a report to the RCA Board of Directors, Sarnoff prognosticated the eventual advent of television for the home.*

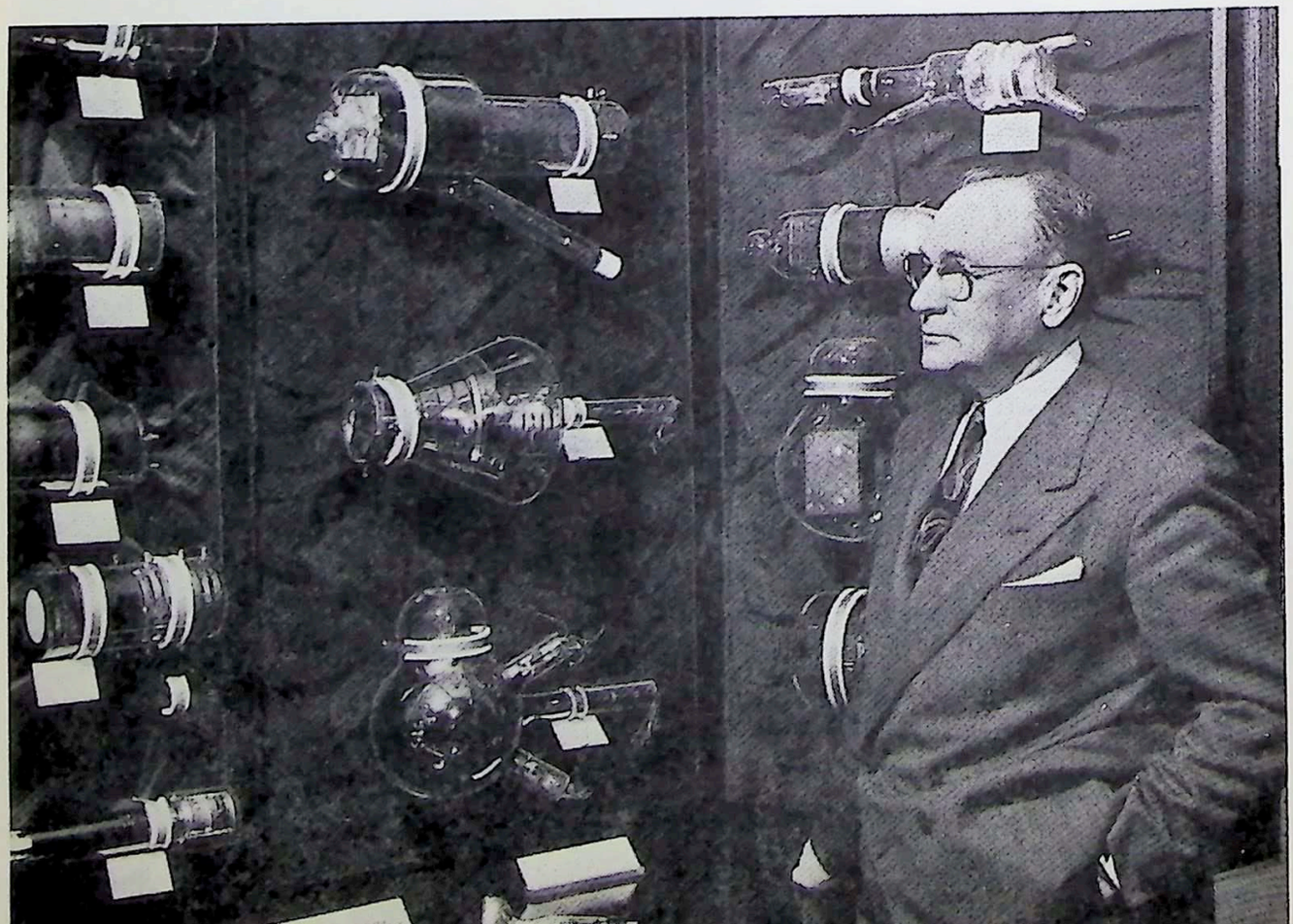
# THE WORLD OF NBC TELEVISION

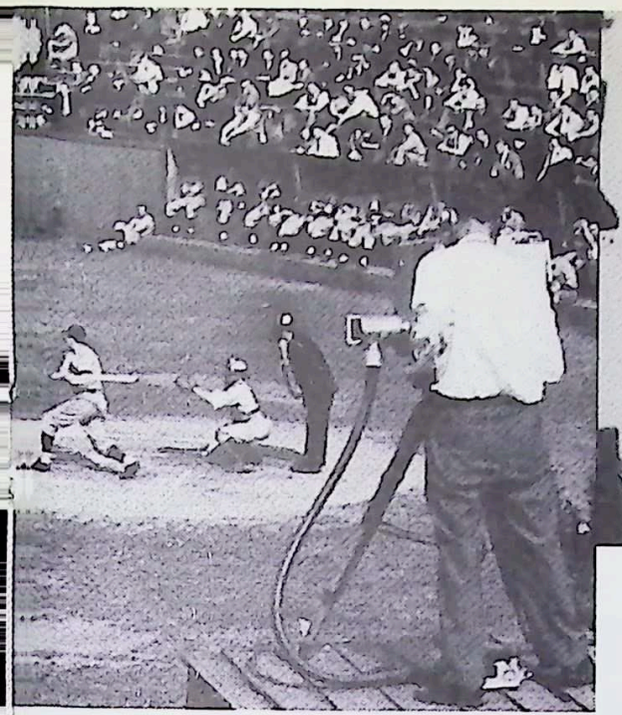
*Bringing mankind together into a single family through television is a David Sarnoff dream that has been fulfilled. He foresaw television transmitting information, education and entertainment to even the most remote areas of humanity in 1927, when television was little more than a dim goal, and a few young engineers began to work on it at the RCA laboratory in New York. He also foresaw mankind's simultaneous reception and phenomenal reaction to this great miracle of electronics.*



*Felix the Cat made a television debut in the late twenties, whirling for hours on a hand-wound phonograph as engineers experimented with early pickup devices.*

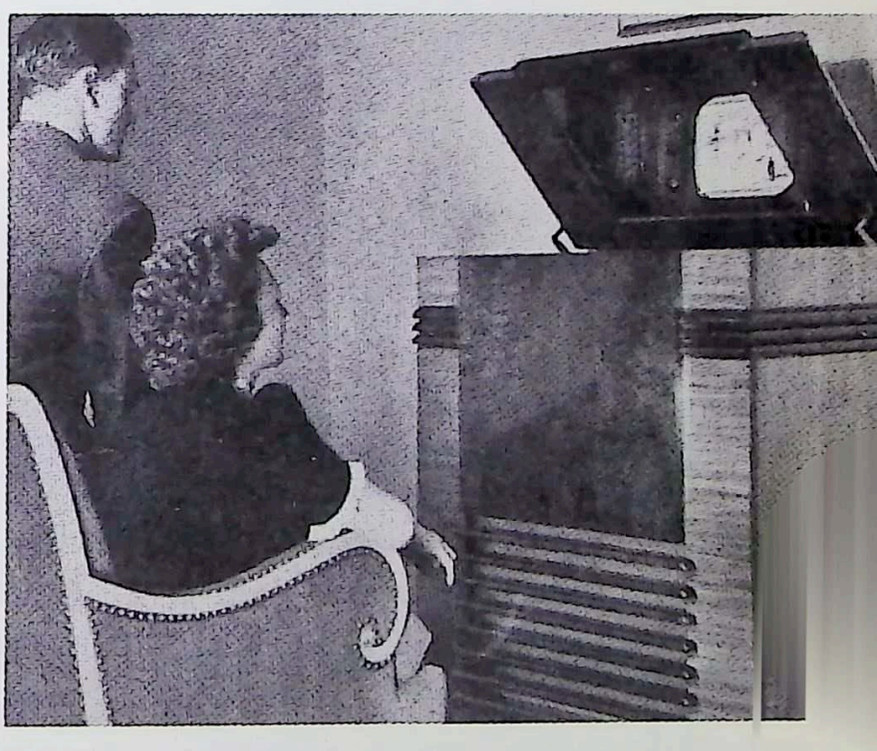
*Dr. V. K. Zworykin, RCA inventor of the Iconoscope, the electronic eye of television, inspecting some of his historic television tubes. Dr. Zworykin also developed the Kinescope, the picture tube of television.*



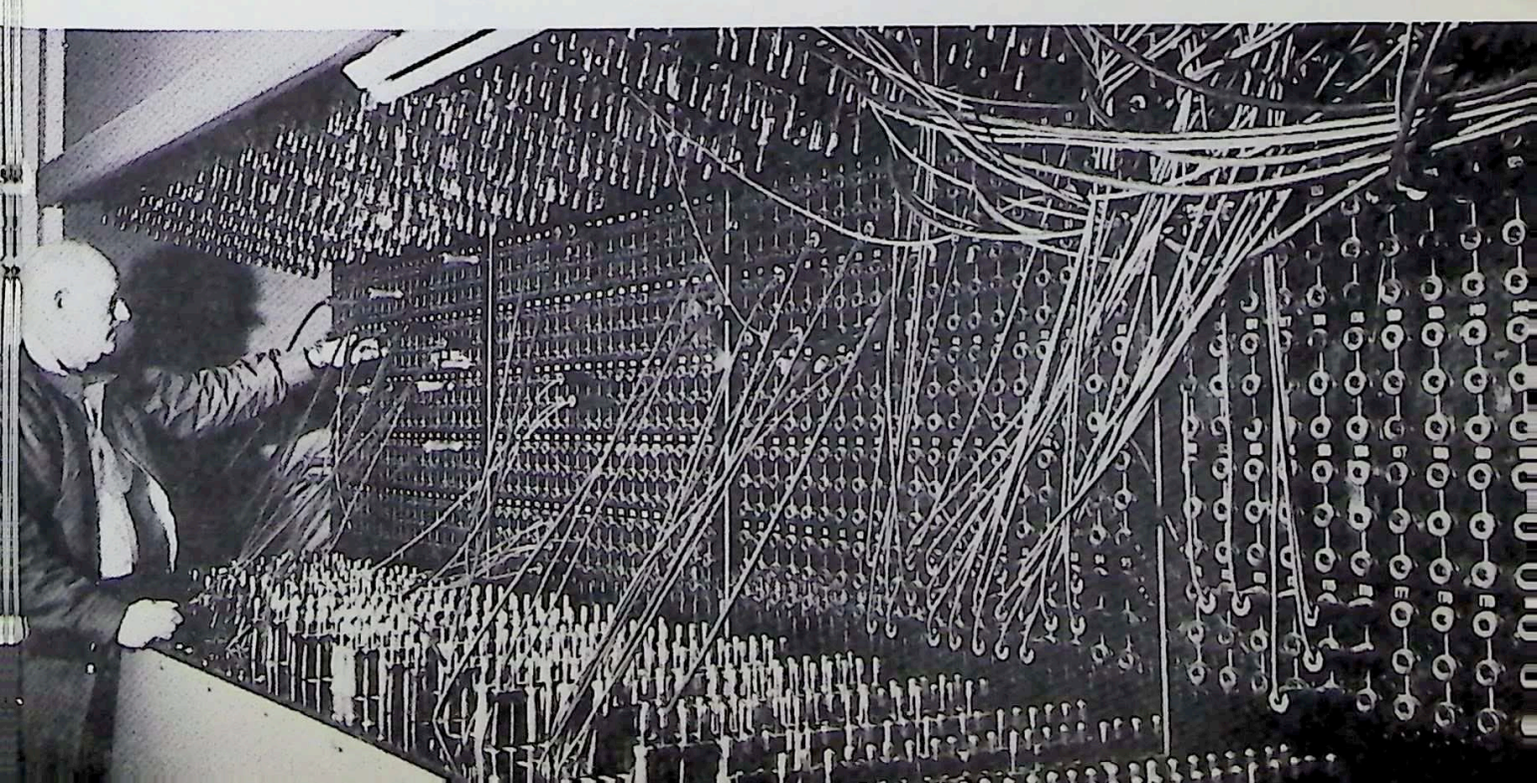


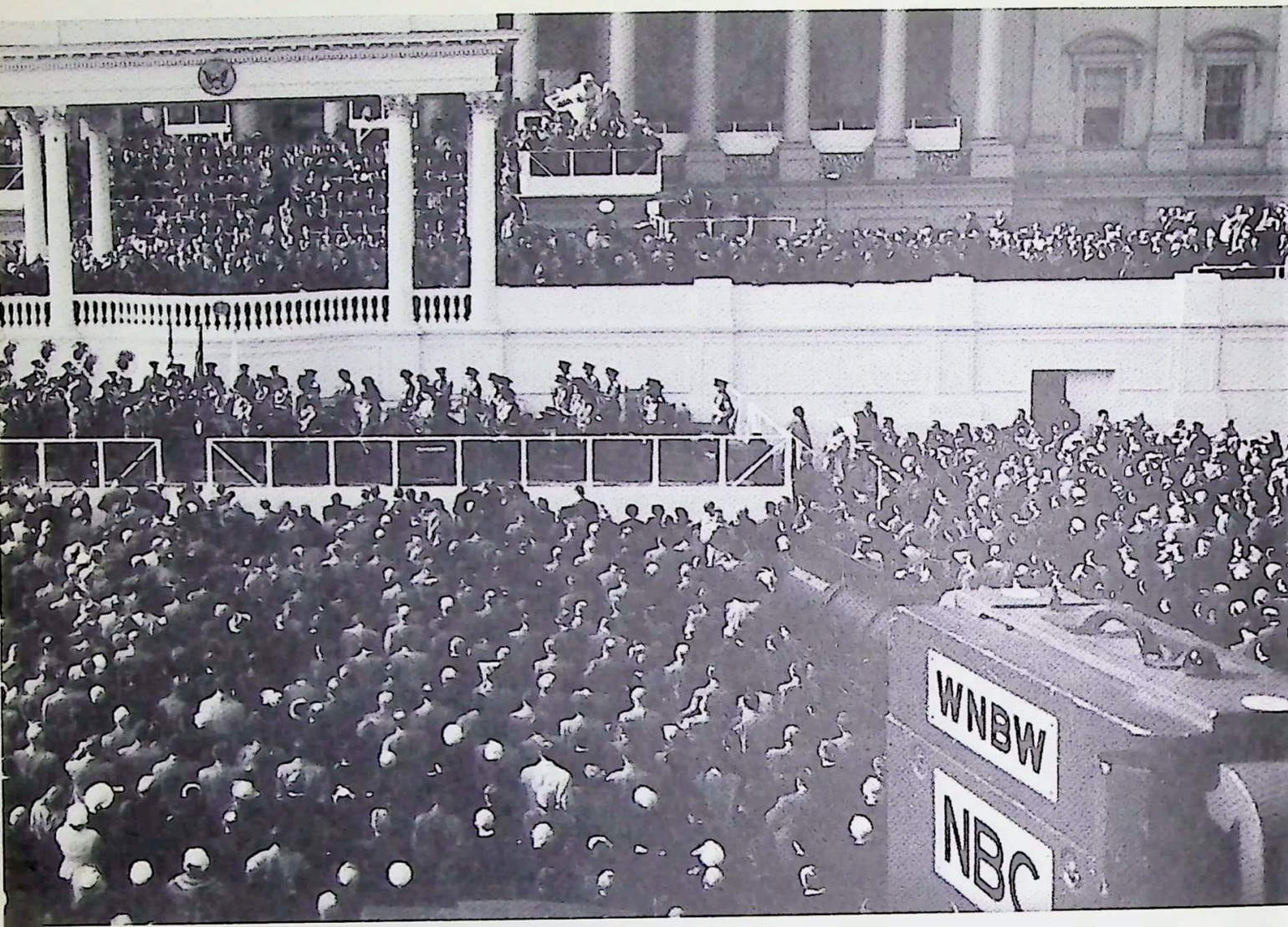
*(Left) First baseball game ever televised, covered by NBC, in New York on May 17, 1939. (Above) NBC-TV cameras scan President Roosevelt at the opening ceremony of New York's World's Fair in 1939. Roosevelt was the first chief executive to be seen as well as heard on the air.*

*The RCA television receiver as introduced in 1939.*

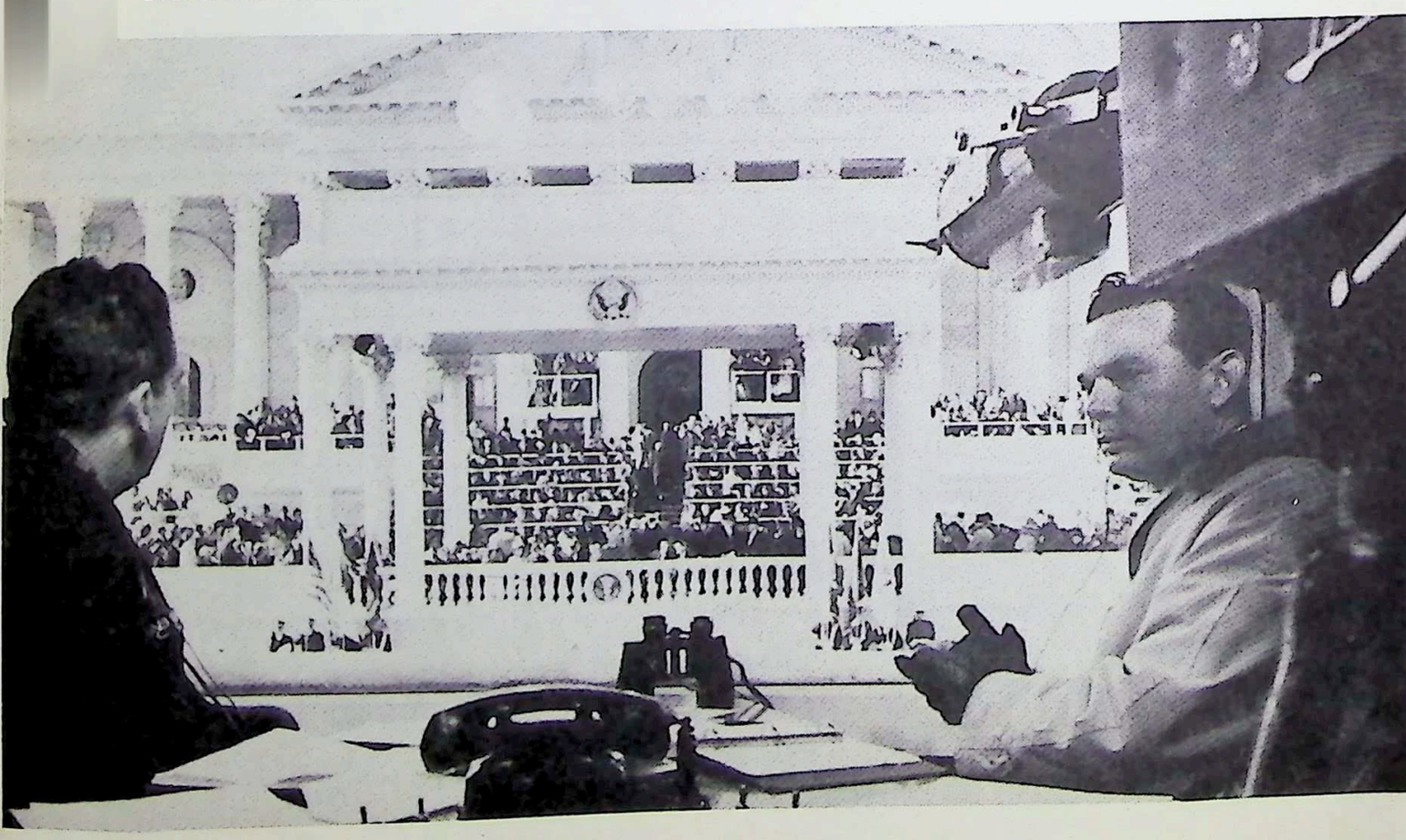


*(Below) Switchboard of the most elaborate lighting system in television, installed in the NBC Burbank, California studio, the first ever built specifically for color television. The lighting system has 1,000,000 watt capacity and 1260 outlets. There are 2400 lighting controls.*






*Presidential inauguration ceremonies (above) are presented live to the nation's televiewers by NBC-TV and telecast coast-to-coast. Full coverage and comprehensive accounts of major news events are given (below) by veteran newsmen Chet Huntley (left) and Washington correspondent David Brinkley on NBC television.*



*An RCA color television control console.*

*In 1967, Chet Huntley and David Brinkley (below) received the Distinguished Service Award from the National Association of Broadcasters "for the development of reporting techniques in their radio and television broadcasts that have given new depth and meaning to the reporting of news to the American public."*

*Chet Huntley (left) and David Brinkley were brought together for the first time for the 1956 national conventions. They came across so well that they were teamed for "The Huntley-Brinkley Report," as an NBC-TV news series colorcast Mondays through Fridays.*

*Dave Garroway, on NBC's morning TV show, "Today," interpreted world headlines and presented personalities who made them. (Below) Color television camermen experimenting with color combinations.*

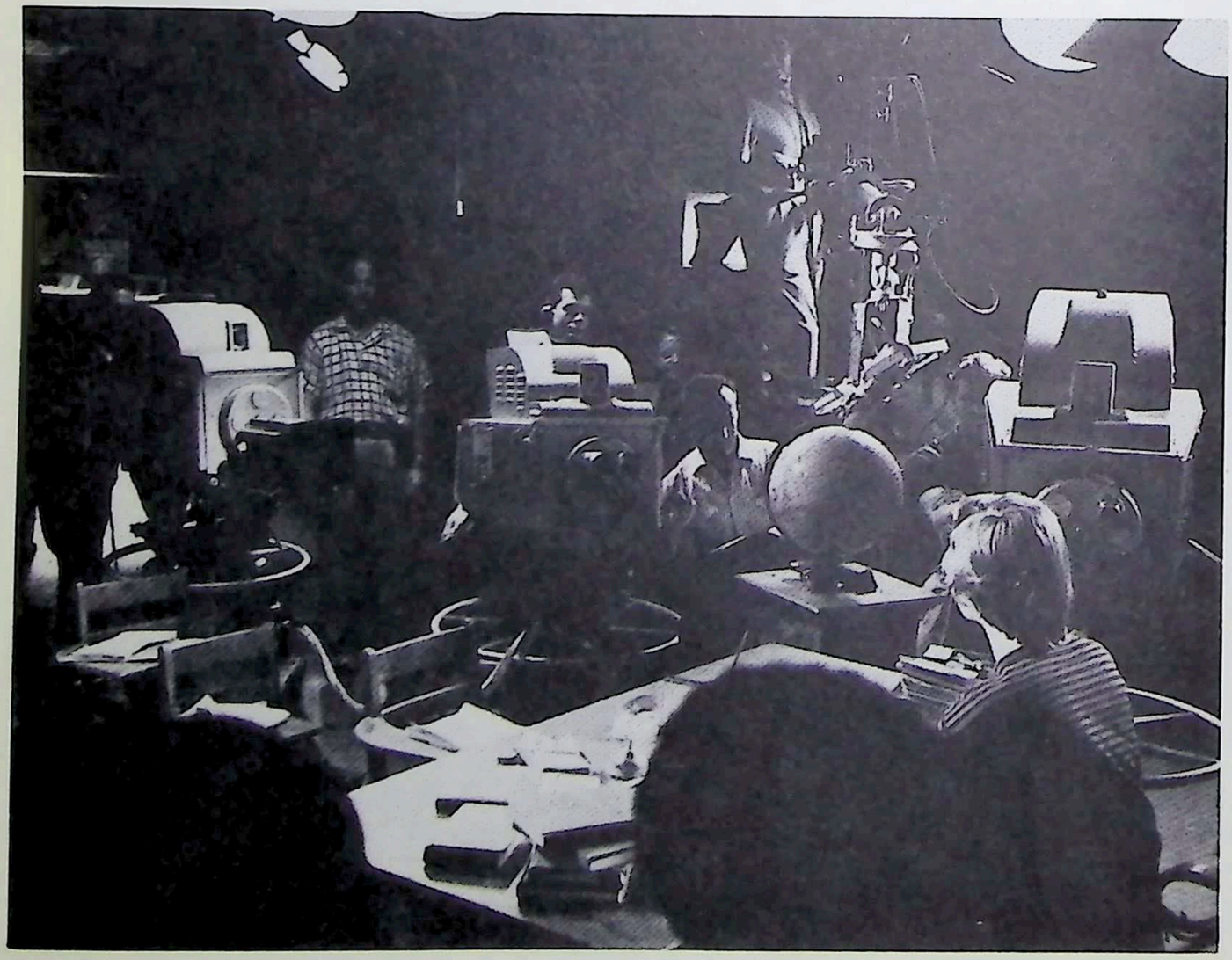
*In one of NBC's TV studios, a single coordinator can view material picked up by various cameras and can switch from one to another to keep pace with developments. (Below)*

*NBC News has the largest broadcasting newsgathering organization in the world. Television commentator Frank McGee (left) reports for NBC News. (Right) Producer Lawrence E. Spivak (standing) with his guest, Gov. Nelson A. Rockefeller, on the distinguished NBC-TV "Meet The Press" program.*

*NBC-TV mobile units bring viewers swift news and live pictures of events as they happen. Major sports events are also televised by NBC-TV.*

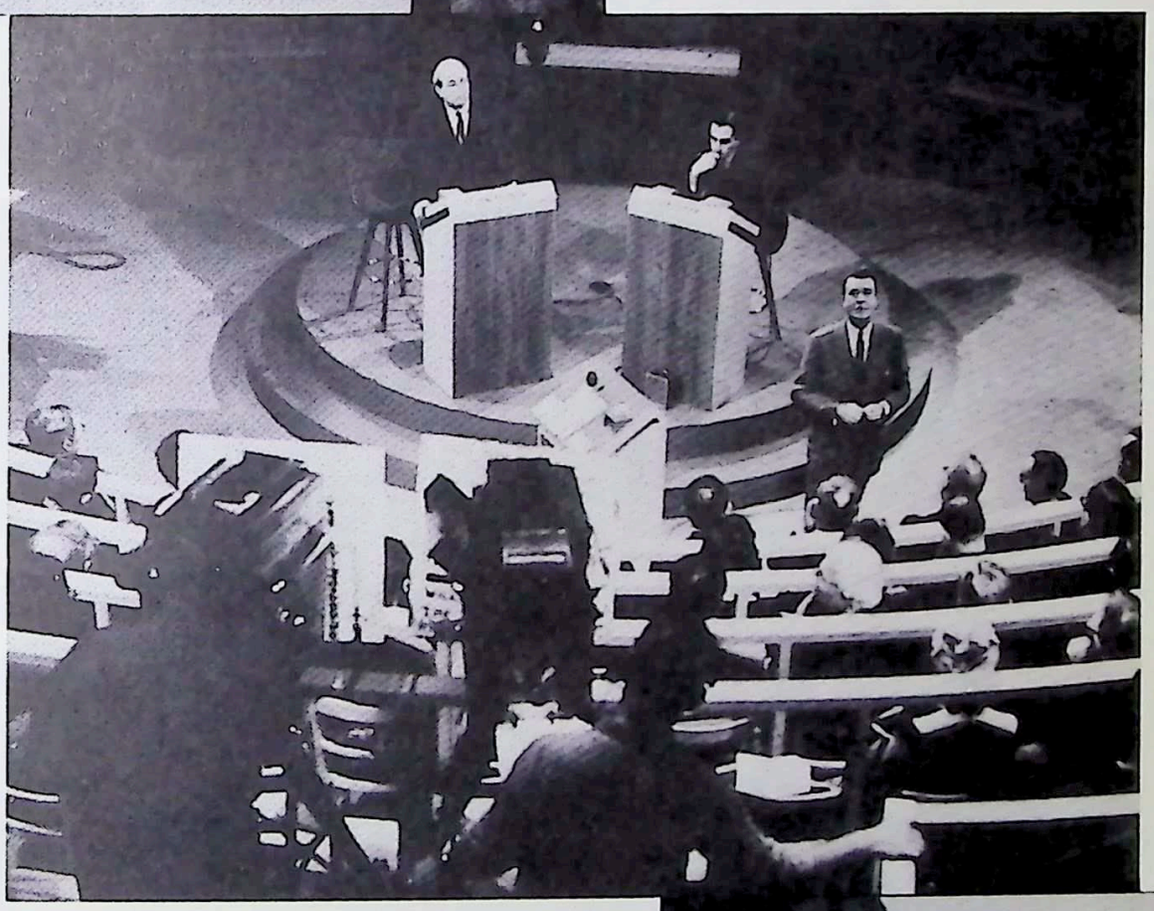
*A special NBC television program was devoted entirely to President Lyndon B. Johnson at his Texas ranch. The TV camera, too, was mobile.*

*A new era in American education has opened up through the facilities of television. TV is proving a valuable weapon in the battle against the twin shortages of faculties and facilities, and provides topnotch instruction by drawing upon the greatest teachers in the country. Pictured is Professor Albert E. Burke of Yale University, explaining to millions of NBC-TV viewers the Geophysical Relief Globe, the most accurate and detailed representation of the earth's surface in existence.*



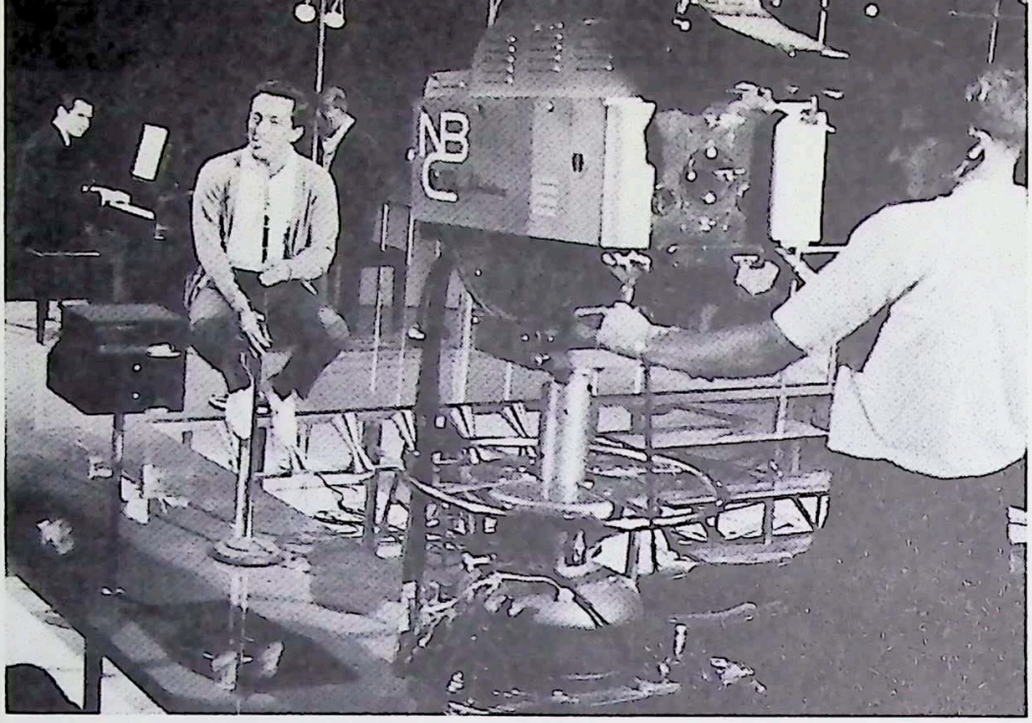
*NBC has been the pioneer in all fields of educational television. In closed-circuit TV, a program originating in one classroom or laboratory can be piped to others throughout a city, state or an entire country.*

*NBC-TV provides the highest quality of instruction by making it possible to draw upon the greatest teachers in America. Dr. Frank Baxter, Shakespearean authority and Professor of English, explains to his television viewers how the earth deflects cosmic rays.*



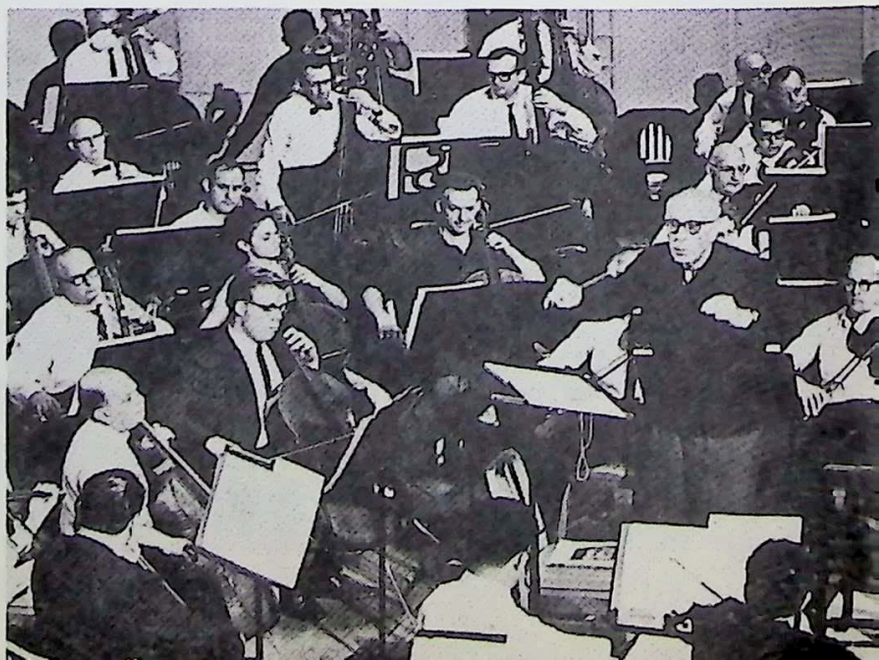
*Through television, eminent men share their knowledge with students all over the United States, and ultimately with those all over the world. Shown here are Dr. Leo Szilard and Dr. Edward Teller, world famed physicists, as they appeared on an NBC public affairs television program.*

*NBC-TV taps the vast reservoir of talent in business, the professions, government, research and the arts. It brings special lectures by such eminent authorities as Willey Ley (right), specialist on rockets and space travel.*




*Andy Williams rehearsing for his NBC-TV program.*

*Sacred songs are sung by a boys' choir on NBC television.*



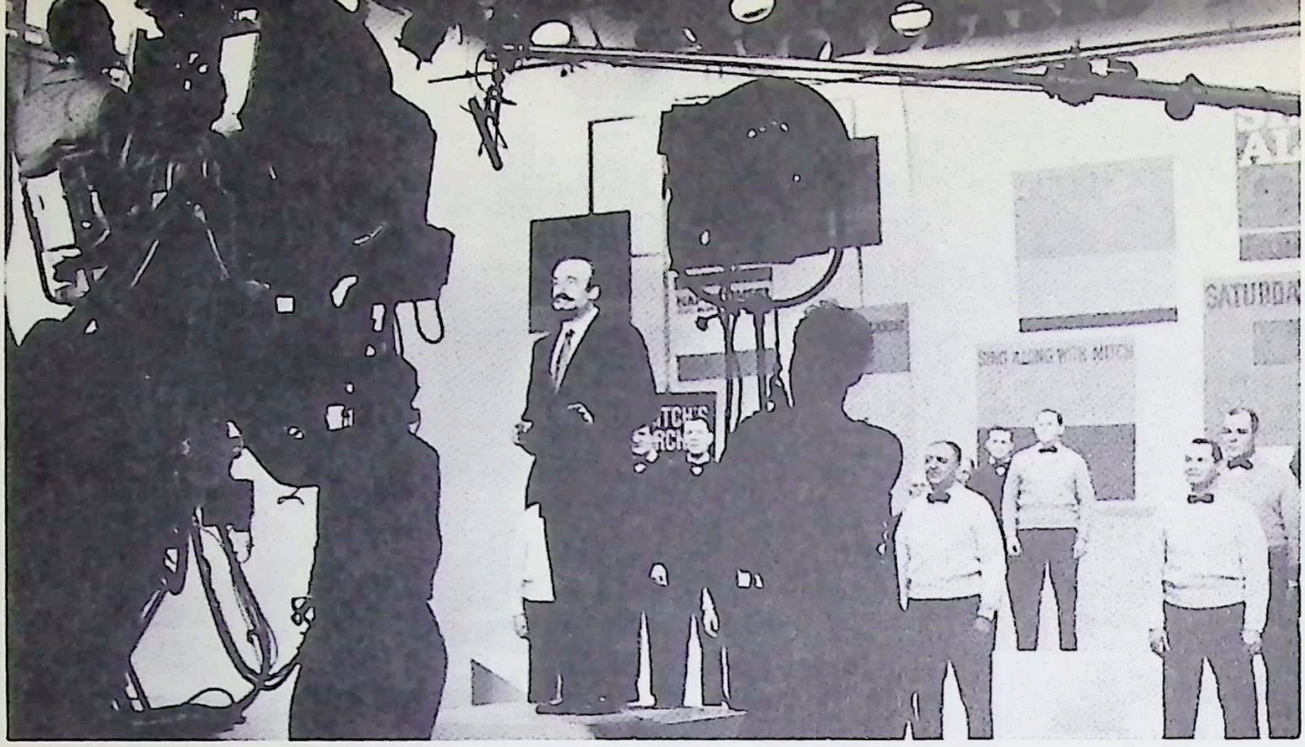
*The Cleveland Orchestra and its conductor George Szell rehearsing for an NBC-TV network colorcast.*

His impact on great music has been enduring, for David Sarnoff is the very embodiment of the music lover of the highest type. A dedicated pioneer of supreme eminence in the field of music education, he introduced the American public to the greatest musical artists, musicians, composers, operas and orchestras of the world as no other man before him. He has done more than any one man to give new dimensions to great music through electronics, and has made the very best in music available to all people everywhere through his tremendous broadcasting outlets. It is now universally acknowledged that because of his admirable accomplishments in the fields of records, radio and television, music has attained its highest possibilities and largest possible audiences. And, because of David Sarnoff, music has found its highest intellectual dignity and loftiest educator.

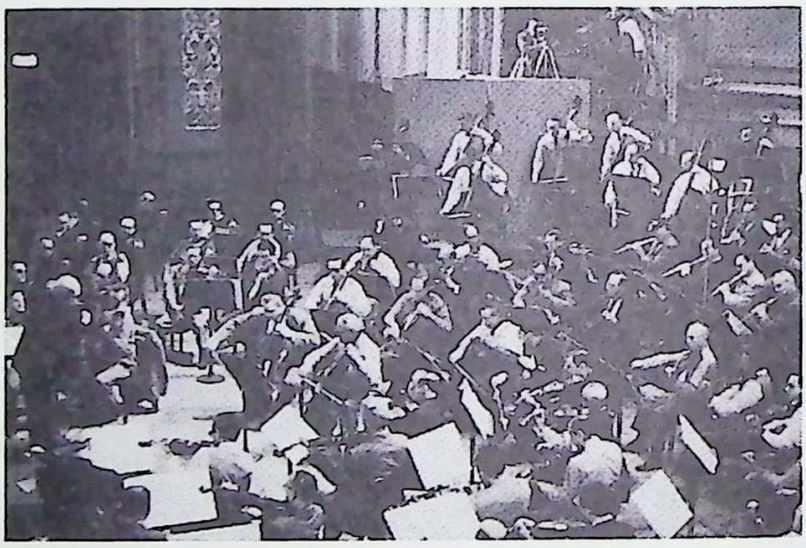
Jascha Heifetz

JASCHA HEIFETZ
*Concert Violinist and Music Educator*

*The world's greatest living violinist and one of the truly great geniuses in all music history, Jascha Heifetz is also a distinguished music educator and teaches master classes in violin playing at the University of California at Los Angeles. An eminent recipient of the Wisdom Award of Honor, Heifetz is shown reading Wisdom Magazine shortly before the Editors of Wisdom honored him with a special edition which was devoted to his wisdom and published in tribute to his unique and brilliant achievements in music.*



*Mitch Miller and his men's choir "Sing Along With Mitch."*



*Arturo Toscanini (right) conducting the NBC Symphony Orchestra on television. (Below) Comedians Steve Allen and Sammy Davis, Jr., combining their musical talents for NBC-TV.*

*(Above) Bill Cosby and Robert Culp star in "I Spy."*

*Barbara Feldon (left), Don Adams and Ed Platt on NBC-TV's colorcast of "Get Smart."*

*Milton Berle*

*Danny Thomas*

*Jack Paar*

*Johnny Carson*

*Hugh Downs, host of the "Today" show, greets two of The Muppets, a troupe of unusual puppet "personalities," created by Jim and Jane Henson, which entertains regularly on the early morning NBC-TV network series.*

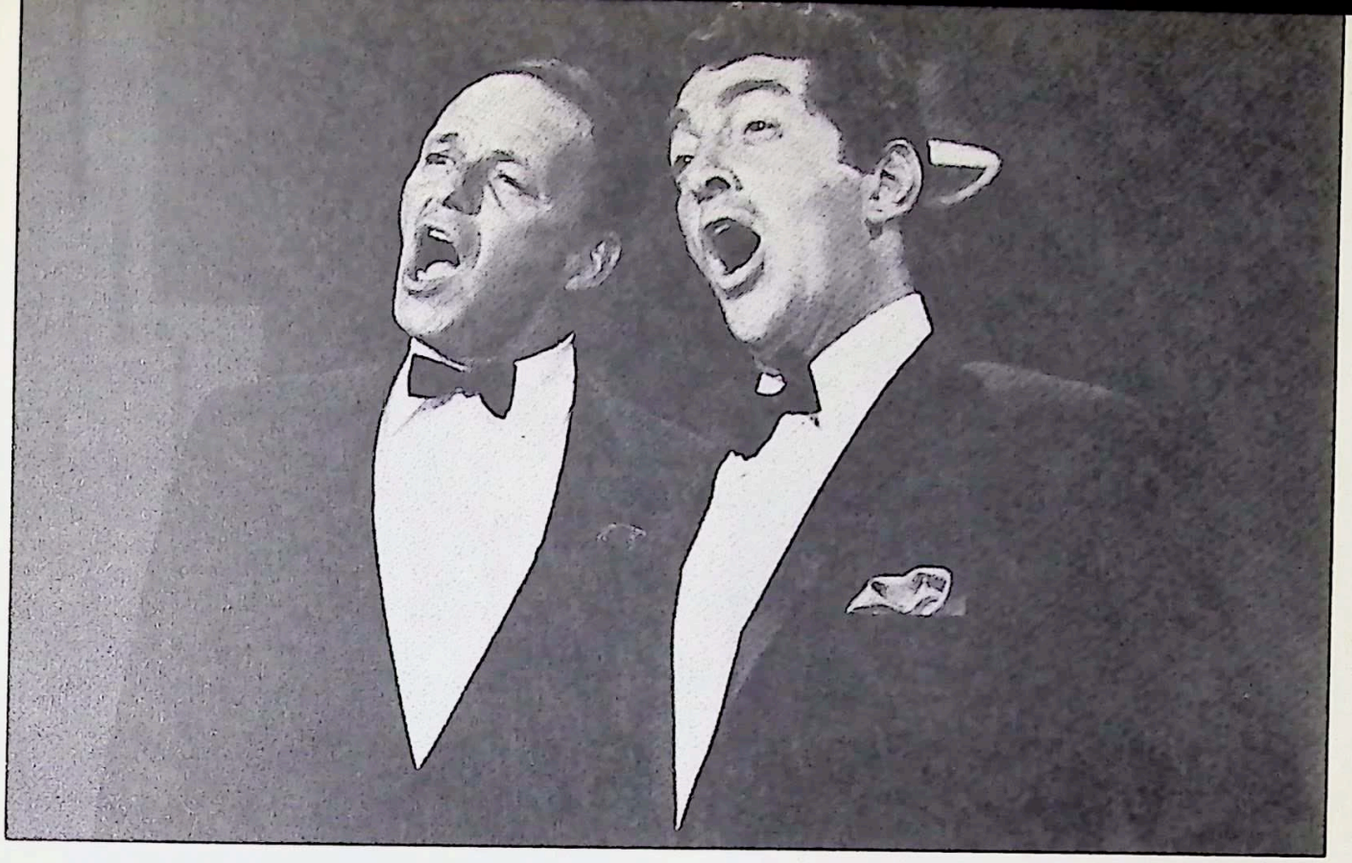
*Perry Como rehearsing for one of his NBC color television programs.*

*Jack Benny*

*Lorne Greene, star of "Bonanza."*

*Mary Martin*

*Frank Sinatra*



*Frank Sinatra and Dean Martin*

*Vocalists Robert Goulet and Nancy Ames*

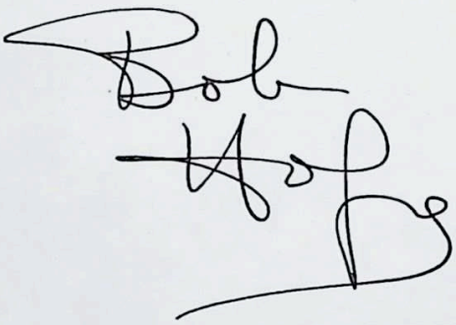
*(Above, left) Bob Hope and Bing Crosby. (Right) Filmed highlights of Bob Hope's Annual Christmas tours of GI overseas bases are broadcast on NBC-TV. Here is Hope in South Vietnam entertaining the soldiers stationed there.*

*Historic collection of comedians was amassed by Bob Hope for a recent NBC-TV comedy special. The funnymen are (left to right) Milton Berle, Wally Cox, Soupy Sales, Dick Martin, Jack Carter, Bob Hope, Jimmy Durante, Dick Shawn and (front) Dan Rowan and Bill Dana.*

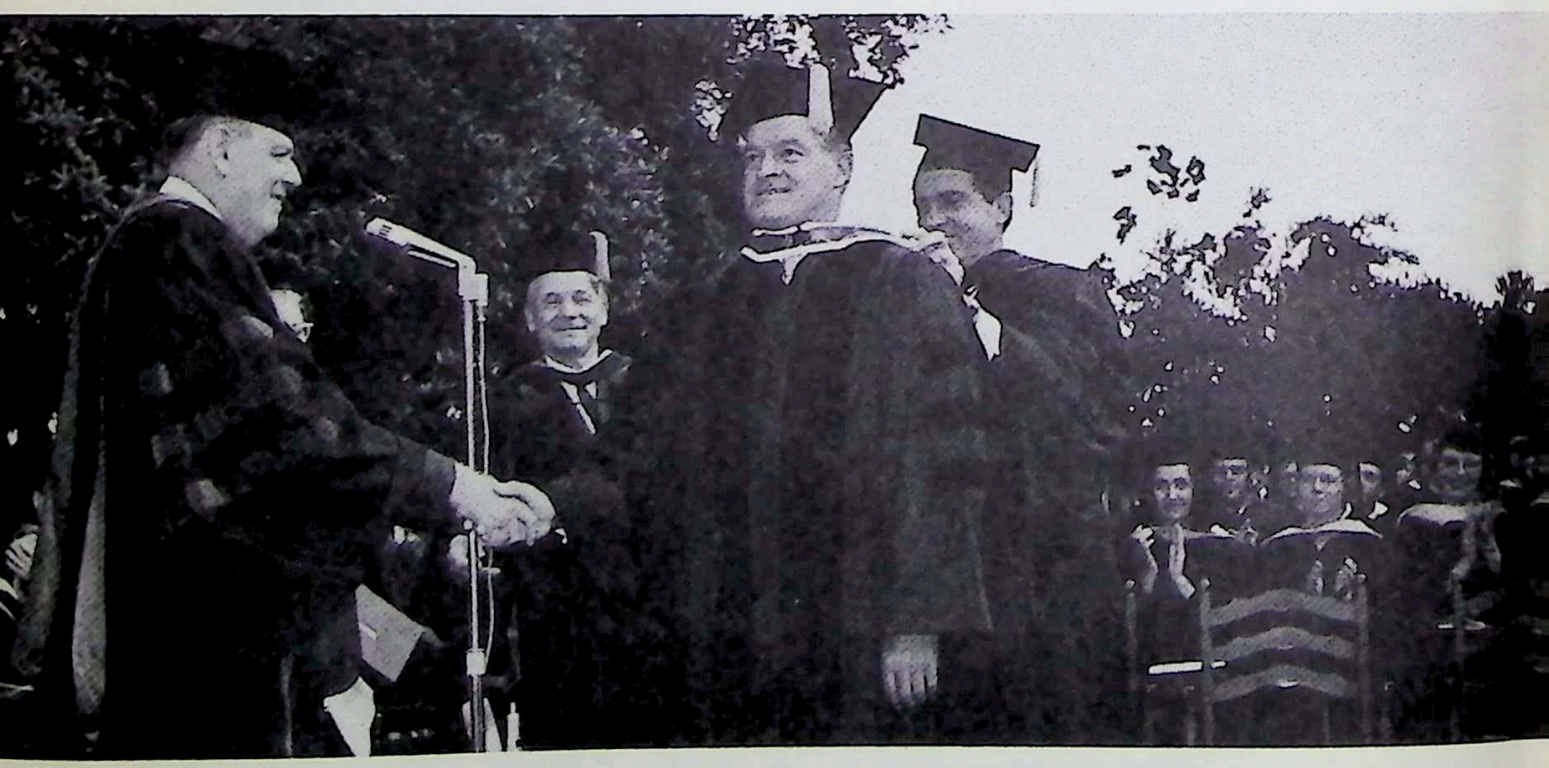
*(Above) Bob Hope is surrounded by 9 of his movie leading ladies who joined him in an NBC-TV comedy special. They are (from left, front) Lucille Ball, Joan Fontaine, Hedy Lamarr, Signe Hasso, (rear) Joan Collins, Dorothy Lamour, Virginia Mayo, Vera Miles and Janis Paige. (Below) Bob Hope doing a monologue.*

David Sarnoff has surpassed the most eminent of contemporary business and industrial leaders in American life. No other industrialist of this country is or has been so well known and so generally esteemed by all classes. It is quite as true that no other private citizen has exercised more or better influence on the development of our national life and spirit. Because he has always aimed to give the widest possible service to mankind, the value of his work to the youth of the world is inestimable. For more than half a century he has been a brilliant leader in thought and action, enjoying an immense popularity that has widened throughout the United States and far beyond. Today, he commands with youthful energy the accumulated forces of his long and inspired life.

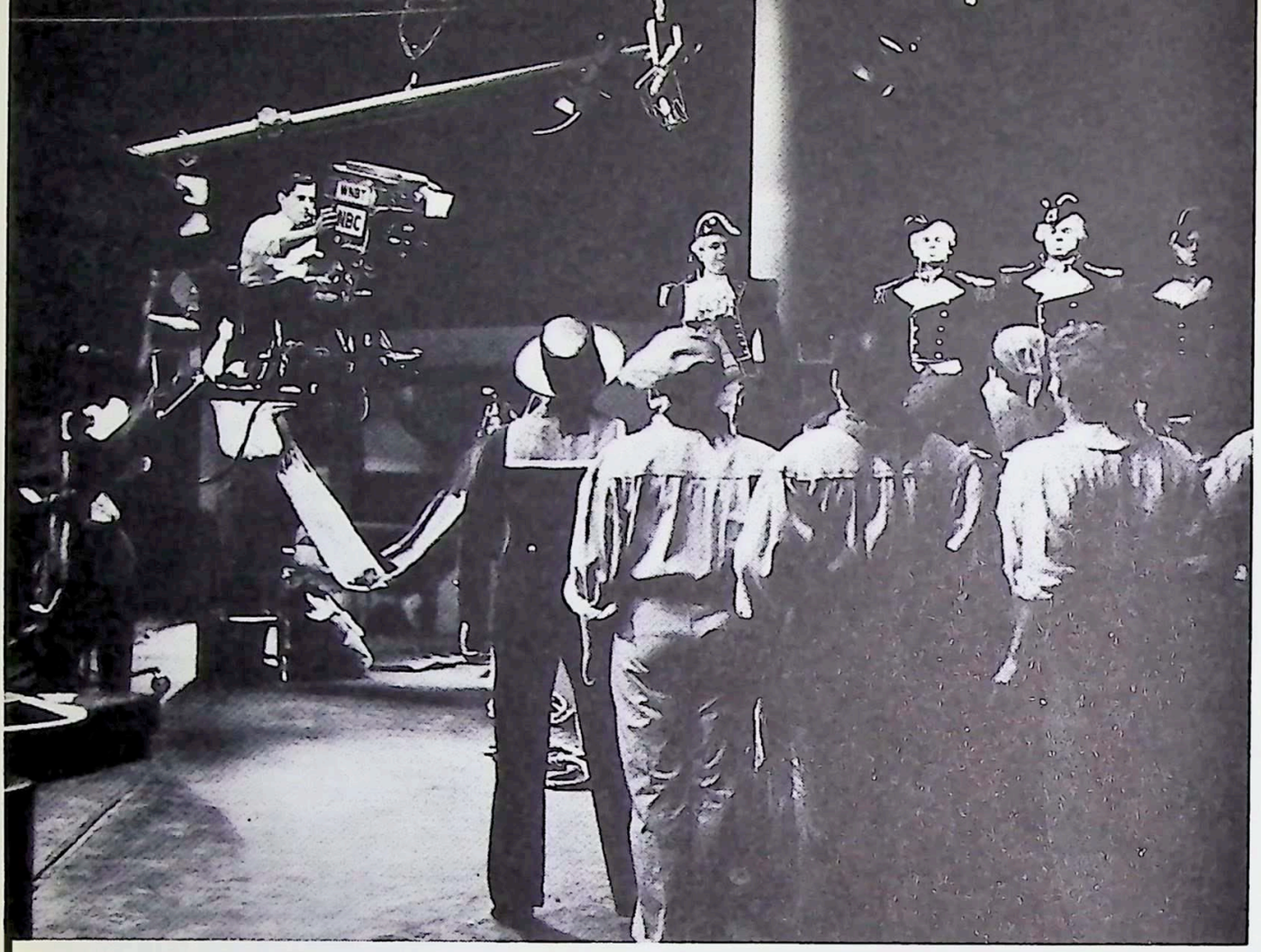
Among the greatest inventions in point of service to all kinds of people are radio and television. No other inventions came into practical service so speedily. Few other inventions went so rapidly around the world and entered at once into every scene of human activity. They speak in all languages and talk on all subjects, in breathless speed through incredible distances. But the most marvelous thing of all about these wonderful achievements is that the Chief Pioneer of radio and television—David Sarnoff—still lives to observe and enjoy the success of his visions, labors, and exhaustless ingenuity. General Sarnoff is greater than the great works which he has achieved, for he is himself one of our nation's greatest achievements.



BOB HOPE



*Bob Hope, television's most popular, most successful star, receiving an Honorary Degree for his distinguished humanitarian work.*




*The NBC-TV production of the first American performance of Benjamin Britten's opera, "Billy Budd."*

*Socrates, played by Peter Ustinov, preaches to his family. Geraldine Page played his wife in "Barefoot In Athens," colorcast on NBC television.*

*Ezio Pinza and Margaret Truman on the RCA Victor Show.*

*Alfred Lunt and Lynn Fontanne in one of their famous plays produced for NBC television.*

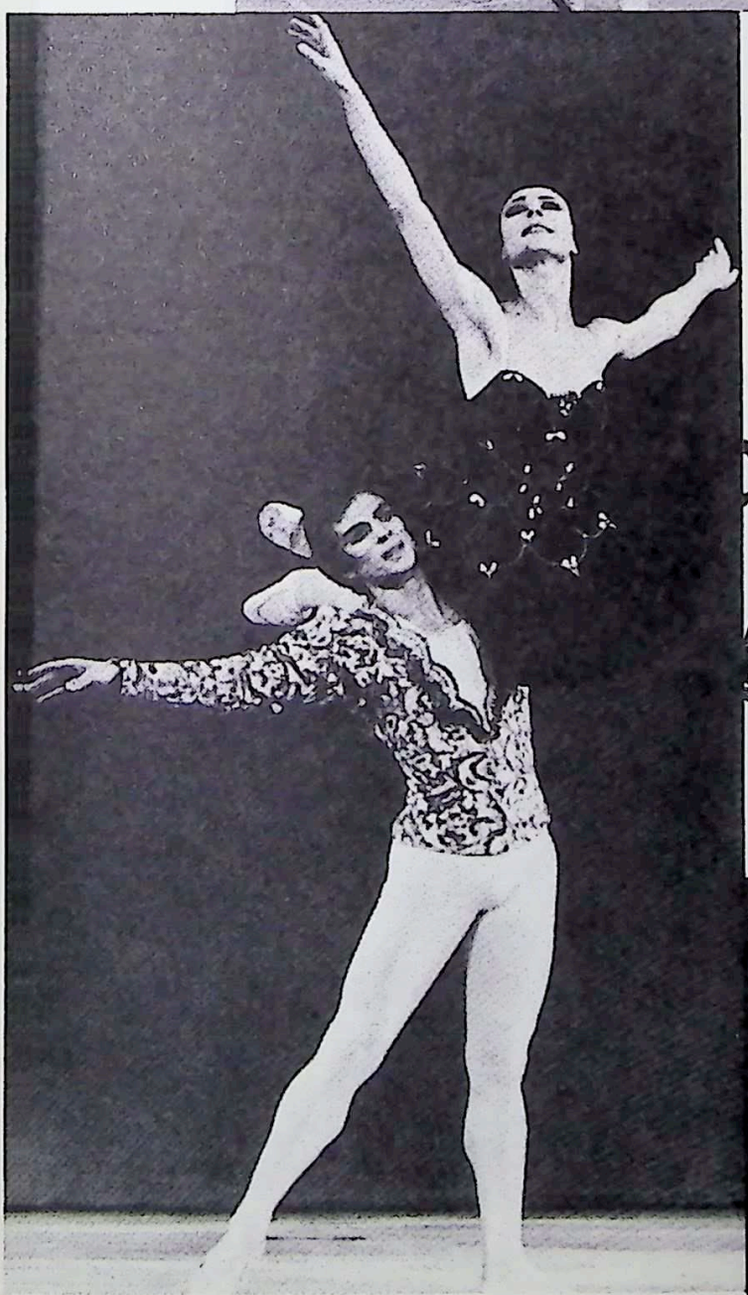
*Mary Martin on NBC-TV's "Peter Pan," probably the most popular play ever presented on television. It will be colorcast again and again.*

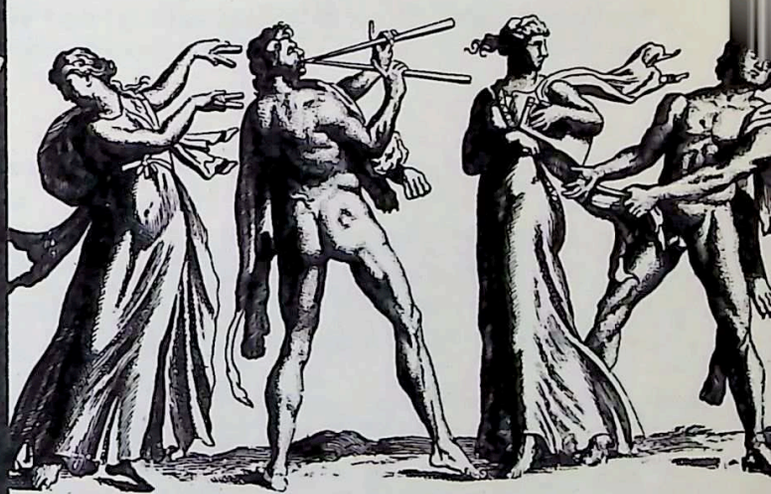
David Sarnoff is a man of true greatness who has a high claim to our admiration for his service to humanity. He lives for something. He does good. He has built a monument of brilliant achievements for the betterment of mankind which the storms of time can never destroy. He has made human hearts happier, human minds wiser, humanity more blessed, and the whole human race more worthy of God. He will leave a great name in human history that will never be forgotten. Time will but augment the greatness of his name and fame. His good deeds and magnificent accomplishments will shine as brightly on earth as the stars in heaven.

Eddie Cantor

EDDIE CANTOR

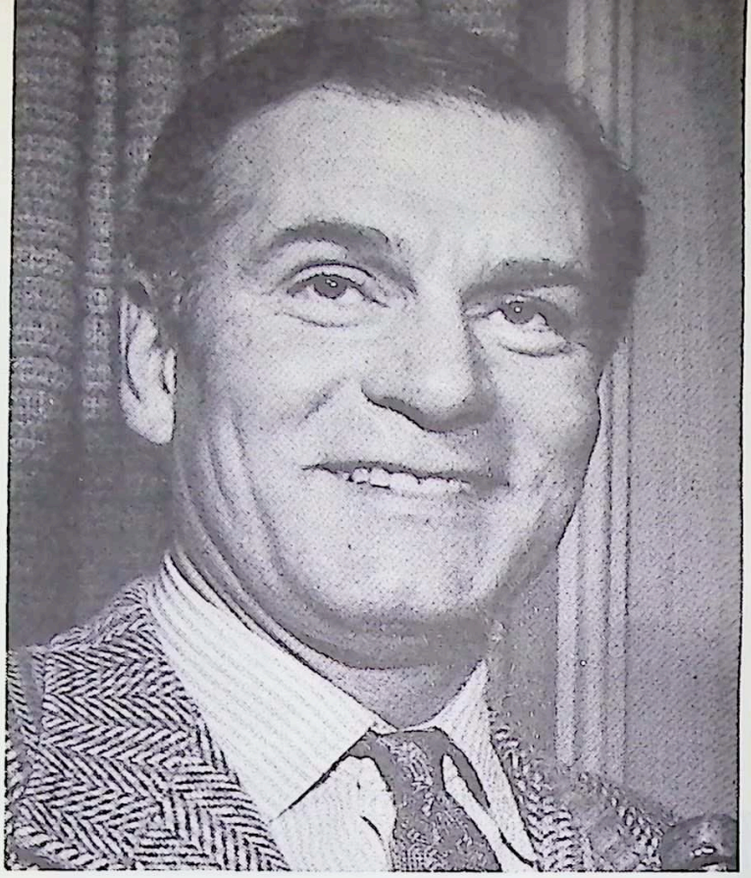
*Ballerina Margot Fonteyn of the Royal Ballet.*





*Margot Fonteyn (below) in "Swan Lake," on NBC-TV.*

*Rudolf Nureyev and Svetlana Beriosova (above), stars of the Royal Ballet, on an NBC-TV colorcast.*

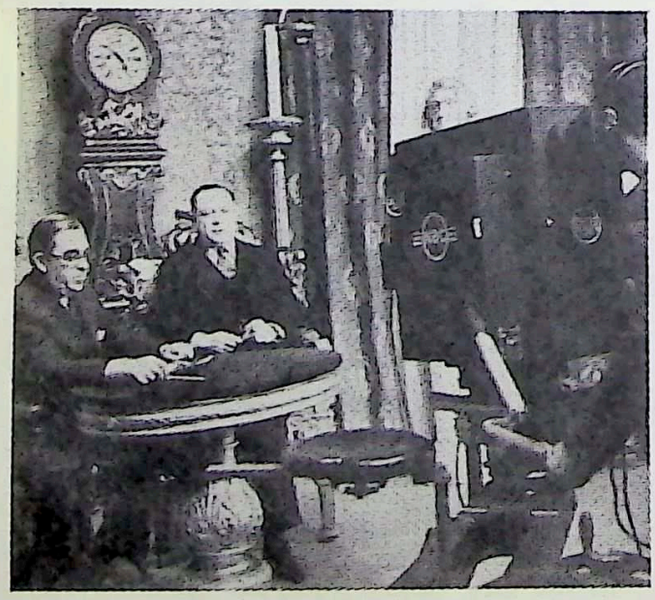


*Sir Laurence Olivier (left) as Richard, Duke of Gloucester, in his Shakespearean presentation of "Richard III," which he produced and directed as well as starred in. Sir Laurence Olivier is one of the eminent actors of this generation and the greatest interpreter of Shakespeare of our time.*

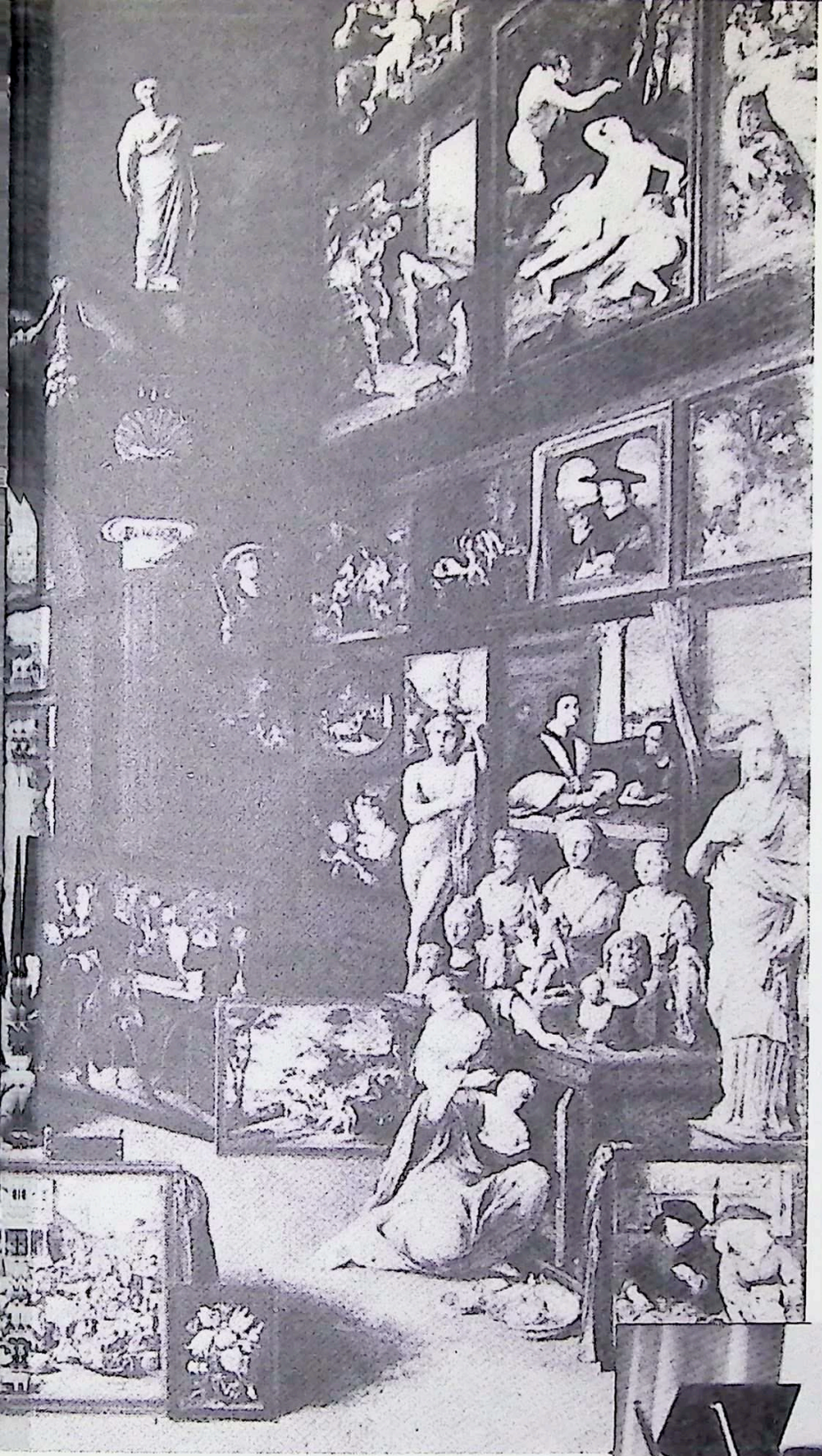
*NBC pioneered in another area, too—the use of great theatrical motion pictures in network television. One of the earliest was "Richard III" starring Laurence Olivier. Lady Anne, played by Claire Bloom, is unable to resist the strange attraction of Richard, Duke of Gloucester (Laurence Olivier), although he has murdered her husband in his ruthless scheme to seize the throne of England for himself. Millions of television viewers saw the Shakespearean play.*

*The famous Old Vic Company of London (left) presented Shakespeare's "Romeo and Juliet," starring John Neville and Claire Bloom, on NBC television in color. The NBC television production of Shakespeare's "The Taming of the Shrew" (right), starring Maurice Evans.*

*Shakespeare's "Romeo and Juliet" as produced for television by NBC-TV.*

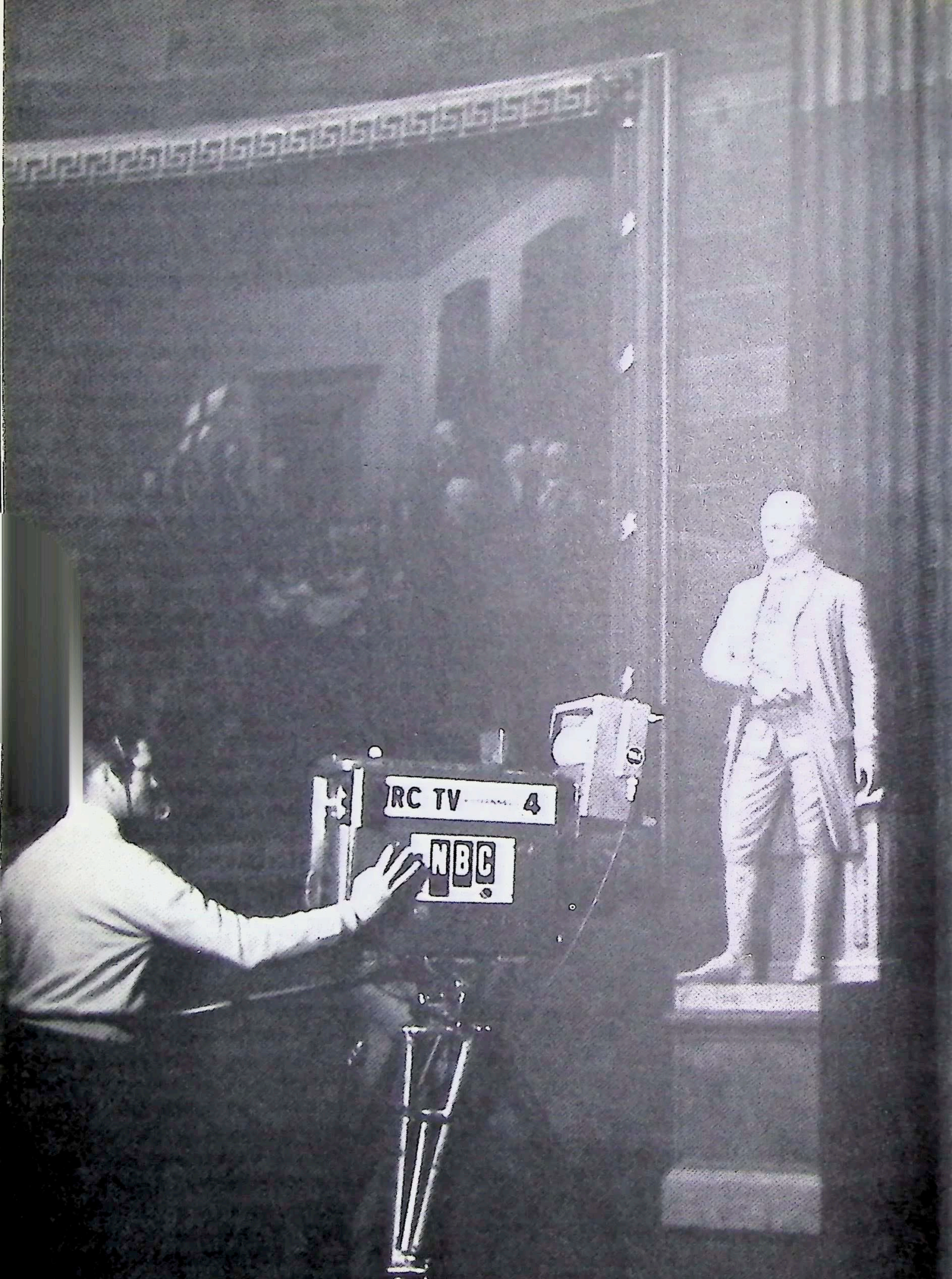


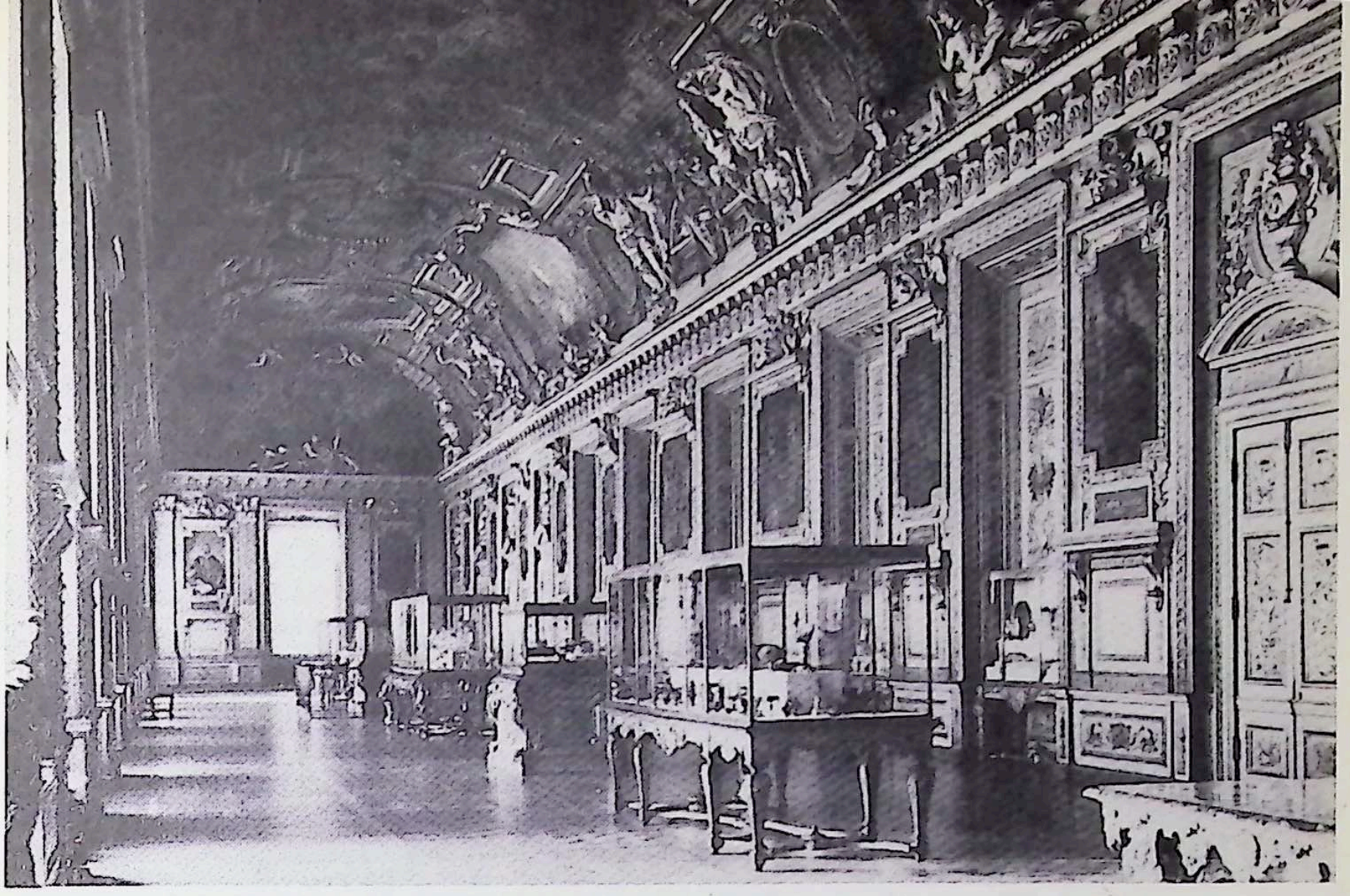
*In 1938, David Sarnoff (right) appeared before the NBC television camera with the late John Golden, famed Broadway producer. Sarnoff made the prophecy that television would bring a new, glorious and inspiring era in the worlds of the theatre, music and art to satisfy the cultural hunger of hundreds of millions of people.*



*Painting by William Van Haecht*

*Television Producer Lucy Jarvis and her director of photography lining up a camera shot on a painting for the special NBC television colorcast on one of the great art galleries of the world, "The Louvre" of Paris.*


RC TV 4
NBC



*NBC color television cameras have brought the world's greatest paintings and sculptures into the homes of millions of Americans over the years. (Above) A hall filled with rare works of art in the Louvre museum in Paris as shown on television recently.*

*The "Nicodemus Pieta" sculpture by Michelangelo (left) in which the artist portrayed himself. It was shown on the NBC television network in a color special which traced the life of Michelangelo through his sculptures, paintings and architecture. (Right) Motion picture star Charles Boyer was the narrator of the NBC-TV colorcast devoted to the great art treasures of "The Louvre." Here he explains a painting by Camille Pissarro.*

# *A Biographical Sketch of*

# *Robert W. Sarnoff*

## *President and Chief Executive Officer of RCA*

Robert William Sarnoff shows the same sharp-edged brilliance in being President and Chief Executive Officer of RCA that his father, David Sarnoff, did when he held that position. His incredible mastery of the vast fields of communications and electronics, his indefatigable work and diligence make him an industrial leader in his own right. Highly individual, yet not unlike his eminent father, who is Chairman of the Board of RCA, each supplements the special abilities of the other and provide a striking example of what we today call "teamwork."

Though his highly esteemed name is inevitably linked with his father's, Robert Sarnoff has already won recognition and glory by remarkably reflecting the chief virtues and greater glory of his father. A man of intellectual attainments, good breeding, good sense and good nature, his imaginative mind teems with creative ideas and extraordinary projects to develop commerce, to increase education, enrich the arts and sciences, and enhance the comforts of life through communications and electronics for the well-being of the American people. He goes about his work assiduously, with enormous energy and industry, saying little but seeing and doing much.

*Robert Sarnoff's far-reaching activities beyond business circles include service to many and varied public service organizations, from the Boy Scouts of America to the American Legion. Here, with Bishop Fulton J. Sheen, he has been presented with the American Legion Award for distinguished public service. He has received many other significant honors and awards.*

A genial talker of intellectual power who loves humanity, his public speeches are quiet and dignified, always captivating and stimulating. A realist and a moralist, as well as a popular lecturer, he has impressed large audiences of thoughtful Americans with his genuine conviction, his universal outlook, his unflinching courage, and his sane, vigorous philosophy packed with worldly wisdom. Among Robert Sarnoff's many admirable qualities is his faith in the possibilities of mankind and in the power of love and wisdom to regenerate the world. In his hatred of war and his ceaseless crusade for intellectual and religious freedom he is ahead of his time. Originality, integrity, versatility, keen observation and wise standards of judgment are his natural inheritance. His accomplishments have already borne its fruit.

Robert William Sarnoff, President and Chief Executive Officer of RCA, has spent more than twenty-five years in the field of communications. During much of that time he has been active in the affairs of RCA as well as of the National Broadcasting Company, having served more than nine years on the RCA Board of Directors, more than ten as a member of its executive council and more than two as Chairman of the RCA Planning Committee, which is concerned with long-range business development.

Historically, he has evinced special interest in at least five major broadcasting areas and seized the initiative by making important contributions to each. A former Navy man fresh from his own wartime experience, he realized how nautical battles are separated within the public mind from the more accessible, and therefore better publicized, land battles. And, as a professional broadcaster, he realized that there is no programing so gripping as the truth, provided it is presented with insight and taste. The result was the NBC "Victory at Sea" series—twenty-six half-hour programs on naval operations during World War II—that set a new television standard and inaugurated a new programing concept, the documentary series. Because it was produced under his personal supervision, Sarnoff was awarded the Distinguished Public Service Award—its highest honor to a civilian—by the United States Navy.

Always concerned that radio and television be properly used for political education and enlightenment, he invited John F. Kennedy and Richard M. Nixon to engage in a series of debates. The ensuing four historic face-to-face encounters between the two 1960 Presidential candidates had a profound effect upon the American political process.

Robert Sarnoff recognized the vast potential of television as a classroom education tool. As early as 1957, he instituted a specialized educational project under which, for the succeeding four years, NBC produced and supplied to noncommercial educational television stations—at no cost to them—232 live half-hour programs, which featured visual instruction in a variety of topics. In October, 1958, another NBC educational project was launched under his personal supervision, "Continental Classroom," the first network television program designed to offer credits toward a degree. Among the many plaudits won by the program was one to Robert Sarnoff in 1963, appreciatively offered by The American Association of Colleges for Teacher Education.

He also supervised formation of the NBC Opera, the first and only regular opera-producing organization in television in America. Since its founding in 1951, the NBC Opera has offered more than forty different operas in more than seventy different performances. It has presented the

American premieres of two operas and the world premieres of eight.

Another of Sarnoff's interests, although first proposed in October, 1962, still seems visionary. At that time (during the first American meeting of the European Broadcasting Union), he proposed the formation of a world-wide organization of broadcasters. Its purpose, which the subsequent advent of international broadcasting via satellite has sharpened: To meet the unique and complex problems of the new era of global television. Sarnoff pledged full NBC support of such an organization.

Robert Sarnoff was born in New York in 1918. He prepared at Phillips Academy, Class of 1935, for Harvard, where he received a B.A. in government and philosophy in 1939. That summer marked the beginning of his career in broadcasting when he took a job with the radio division of the New York World's Fair. Thus, the twenty-fifth anniversary of his association with the communications industry occurred in 1964.

His real career in effect began in 1941, however, when, after studying at Columbia law school, he took a job in the broadcasting section of the office of the Coordinator of Information, Washington (later the Office of Strategic Services), where he worked under General William J. Donovan.

With the advent of World War II, he entered military service and, in March, 1942, was commissioned an Ensign in the Navy. Again, his efforts were directed toward communications—first as communications officer under the Chief of Naval Operations and then, for two years, under Admiral William F. Halsey in the Pacific. On the latter tour of duty, he supervised the establishment of direct radio circuits to the United States from New Caledonia, Guadalcanal, Bougainville and other key islands.

Sarnoff returned to the continental United States in December, 1944, and served in Los Angeles as liaison between broadcasting networks and the United States Navy. When separated from the military in late 1945, he was a Lieutenant (USNR).

Back in civilian life, he again resumed his career in communications as an assistant to Gardner Cowles, Jr., Publisher of *The Des Moines Register* and *Tribune* and President of what is now Cowles Communications. After serving a year in Des Moines, Sarnoff joined the staff of *Look* magazine in New York.

But the long standing family interest in broadcasting was too strong a magnet to resist, and Robert Sarnoff in 1948 joined NBC. His first post was as an account executive in NBC Sales. Then began a series of rapid moves that enabled him to experience a cross-section of network activity. After serving as assistant to the national program director of the NBC-TV network and gaining insights into the production scheme of things, he became television production manager in 1949. Knowing thus how the programing product is created, he subsequently experienced the opposing function—selling it—as television program sales manager in 1950. From there, he became director of NBC unit productions in 1951, the year that also marked his initial appearance among company officers —as Vice-President in charge of NBC films.

By 1953, he was ready for close-up study of top-level administration and became executive assistant to the Vice-Chairman of the Board of Directors. He graduated from that post to become Executive Vice-President from 1953-55. After that, he was elected NBC President, a position he held from 1955-58. For the succeeding seven years, he served as Board Chairman and Chief Executive Officer of the National Broadcasting Company. The younger Sarnoff has been a member of the NBC Board

of Directors since 1953 and of the RCA Board since 1957. He was elected to his present post, the President of RCA, on January 1, 1965.

He was the first President (1952-53) of the Radio and Television Executives Society (now the International Radio and Television Society). In 1956, he won the award for distinguished service to advertising, presented by the Advertising Federation of America for his contributions as General Chairman of the AFA's promotion of National Advertising Week that year. He received the Keynote Award of the National Association of Broadcasters at their 1959 convention where he made the proposal that led to the establishment of the Television Information Office.

Robert Sarnoff is notably active in nonbusiness organizations like the Boy Scouts and the American Red Cross. On behalf of the latter, he has served as national co-chairman of the fund campaigns for 1964, 1965 and 1966—the first person since World War II to serve three successive terms.

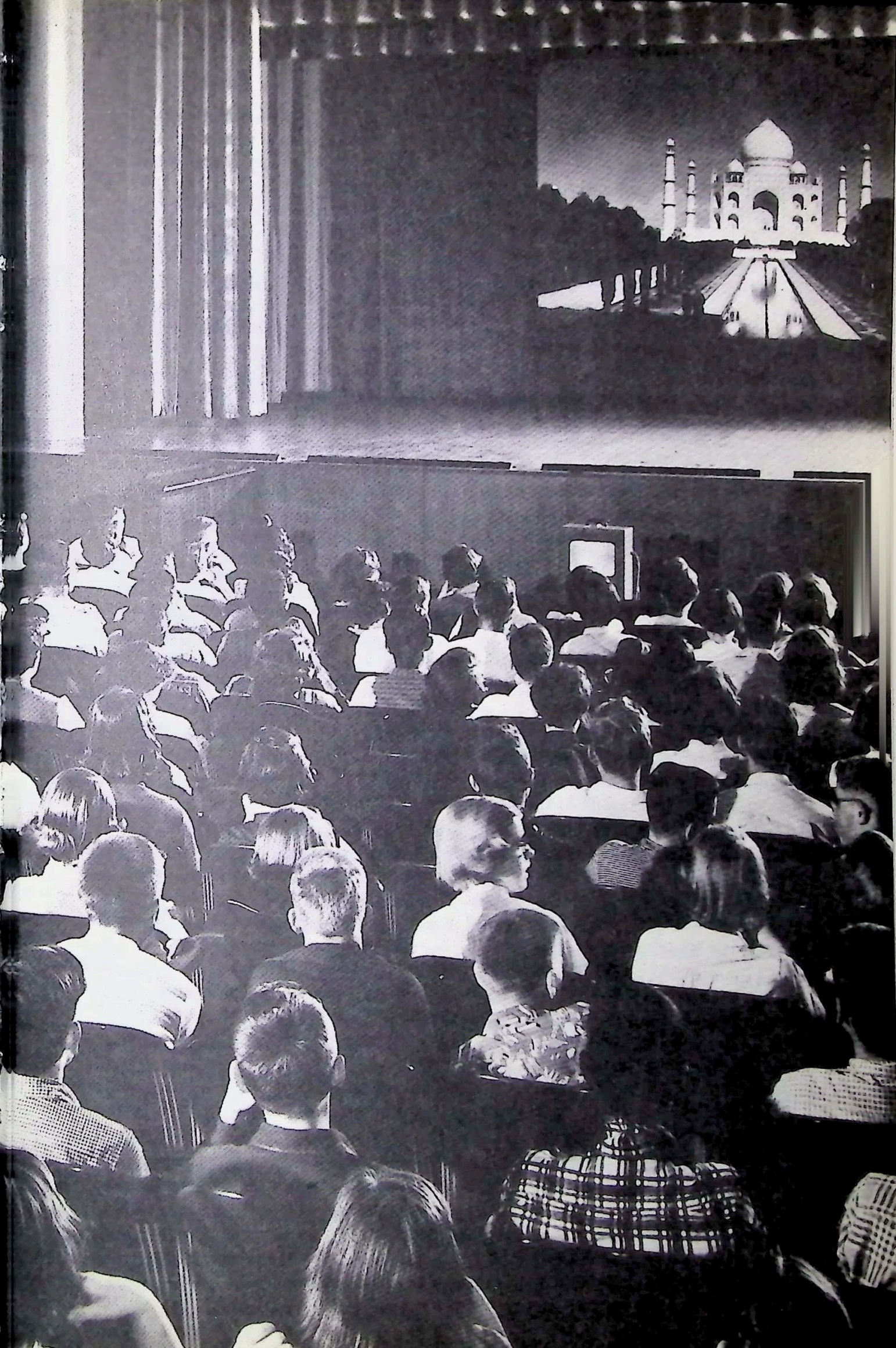
He is, among his many additional memberships, a Director of the American Arbitration Association, a former Director of The Advertising Council and of the Harvard Alumni Association, President of the Alumni Council of Phillips Academy, on the Board of Visitors of the school of public relations and communications of Boston University, a Trustee of Franklin and Marshall college, President and Director of the Friends of the Whitney Museum of American Art, a Trustee of the John Fitzgerald Kennedy Library Corporation, a Director of the Roper Public Opinion Research Center, a charter member of Television Pioneers, an honorary life member of the Association of Advertising Men and Women and a member of the Grand Street Boys Association.

On March 9, 1967, Bob Hope presented Robert Sarnoff with the International Radio and Television Society Gold Medal Award, at a banquet in New York, "for his distinguished record of public service through broadcasting." Hope himself is a winner of an IRTS Gold Medal. Sarnoff was the first President of the Radio and Television Executives Society, now IRTS.

Undoubtedly Robert William Sarnoff stands out today with distinction for the considerable amount and significance of his work. His permanently established reputation grows rapidly as the RCA organization vigorously expands into new fields with increasing zest and the years bring new accomplishments. His brilliant planning has resulted in remarkable achievements that have determined the permanency of his notable work and have won him recognition throughout America and the many honors bestowed upon him.

*RCA President Robert W. Sarnoff (left), former New York Mayor Robert F. Wagner and Labor Leader A. Philip Randolph receiving the first annual Frederick Douglass Gold Medal Awards in 1966, presented by the Urban League of New York, "for leadership and achievement in advancing equal opportunity."*

# *Robert W. Sarnoff*
# *On*
# *Communications*
# *And The*
# *Knowledge Industry*



Perhaps the most distinctive characteristic of this era is its emphasis on an element of power that has not been fully utilized in the past to advance the human destiny. That power is knowledge. Like electricity and other forms of physical energy, it can be channeled into new products and services, new human activities, and even the creation of new forms of society. The preoccupation with knowledge has moved outward from the classroom and the laboratory into the business office and government bureau, farm and factory—from the seats of learning to the centers of decision. It has even been suggested that the entire business of man ultimately may become learning and knowing, and all forms of wealth will be created by the movement of information.

The Knowledge Industry, as the experts are beginning to call it, covers the entire information spectrum, from research and education to television and publishing. It is everything that relates to the acquisition, processing, and dissemination of information. This industry is growing at a rate twice that of the economy as a whole. It may one day soon account for as much as half the gross national product. Consider, for example, the information that will be streaming in from satellites scanning the world of space, from electron microscopes probing the world of the molecule and atom, from computers assembling, sorting, and retrieving every item of knowledge recorded by humans.

Moreover, this industry generates its own momentum. Each increase in the sum of knowledge increases the complexity of the society which uses it, and this, in turn, calls for more knowledge. It is small wonder that the world's information, which is doubling with each generation, has grown far beyond the capacity of any individual to comprehend it all. And this has led to a dilemma and a crisis in the human condition and the social organism.

Because no man is a computer, capable of total information storage and recall, he is penned increasingly into areas of specialization—forced to make a choice of interests, condemned to know more and more about less and less. The result is that at a time when he should encompass an increasingly wide range of knowledge, his scope has narrowed. Specialization has bred parochialism and ignorance of other fields. Ignorance has led to indifference, and indifference has sometimes festered into hostility. Nowhere is the schism more evident and nowhere is it potentially more perilous to the progress of mankind than the one which exists between technology and the humanities.

The estrangement is not altogether novel. A provocative scholar of technology and communications, places the great divide in the late Renaissance, when the invention of the printing press finally assigned the symbols of the two cultures—the scientific and the humanist. Numbers were established as the language of technology, and letters as the language of the humanities. In the centuries since Gutenberg, the gulf between these disciplines has steadily grown wider. New discoveries and inventions, proceeding at an accelerating rate, have greatly extended man's perception and control of his natural environment. In sheer volume, these developments have far outstripped progress in the perception and control of the human environment. This imbalance has further aggravated the division. Scientists, engineers, and technicians—increasingly important members of the population—are often too preoccupied to give serious consideration to the humanities and social fields. Thus, they frequently suffer from the absence of values which give mean-

ing to life and direction to work. Talents which could be tremendously helpful in the social fields are seldom put to such use.

On the other hand, the creative artist and social commentator rarely take the time or make the effort to understand the technology that has become so much a part of their life and times. From their ignorance and misunderstanding springs the mistrust of science that permeates so much of today's creativity. A recurring theme in literature, typified by the novels of Aldous Huxley and George Orwell, is that man has lost control of his technology. Like the sorcerer's apprentice, he has become the slave instead of the master of the machine. The French sociologist, Jacques Ellul, carries the thought a step further by asserting that it is not merely the machine that is taking over but what he describes as technique, or the movement to rationalize and standardize all human activity. This force, which he says has become an end in itself, is subverting the traditional values and dehumanizing man himself.

The fear of technology is as ancient as the legend of Prometheus stealing fire from the gods or the story of the Chinese sage who refused to use a plough because, as he said, "Whoever uses machines grows a heart like a machine." This thought was carried to its logical conclusion a century or so ago in the novels of Samuel Butler. He proposed that the problem be solved by suppressing knowledge and demolishing machines. These prejudices are not academic nor are they limited to a handful of intellectual mandarins. In one form or another, they extend to every strata of our society, which cheers the latest breakthrough in science but worries about the consequences. The dispersal of a mushroom cloud around the world moves us to awe at man's unlimited power and to dread at his limited wisdom. We want all of the products of automation but so many of our present-day labor troubles are in protest against its dislocations. A cliche of the entertainment world is the mad scientist—indifferent to the fate of humanity and intent only on proving out his theories. So the schism grows, and it has both its serious and its lighter aspects.

The answer to the problem of increased knowledge is not greater ignorance any more than the answer to the computer is a return to sampling a witch's cauldron or divining the flight of birds. The solution to the information explosion lies in the better organization of knowledge, in its broader distribution and use. We need to put our intellectual house in order so that we can move easily from room to room and feel at home with any mental furniture—from the purely aesthetic to the wholly functional.

In a limited sense, other ages and societies found the answer, and it is up to our generation to do so again in the face of a far more formidable challenge. For the ancient Greeks, as Edith Hamilton has pointed out, "The truth of poetry and the truth of science were both true." They sought and brilliantly achieved the development of the whole man, and the result was a human flowering that gave birth to Western civilization. A similarly broad approach to life was attained by the Renaissance man, personified by Leonardo da Vinci with his creative genius as an artist and inventor, or by Lorenzo de' Medici as statesman, poet, mercantilist, and patron of the arts. At a later time, the Age of Enlightenment produced such giants as Franklin and Jefferson—men of science, statesmen, social philosophers. What was common to all these men and to their times was the balance they achieved between science and art, reason

and emotion, hard fact and human intuition. And in those days a man of intelligence could hope to grasp móst of the knowledge that was then available.

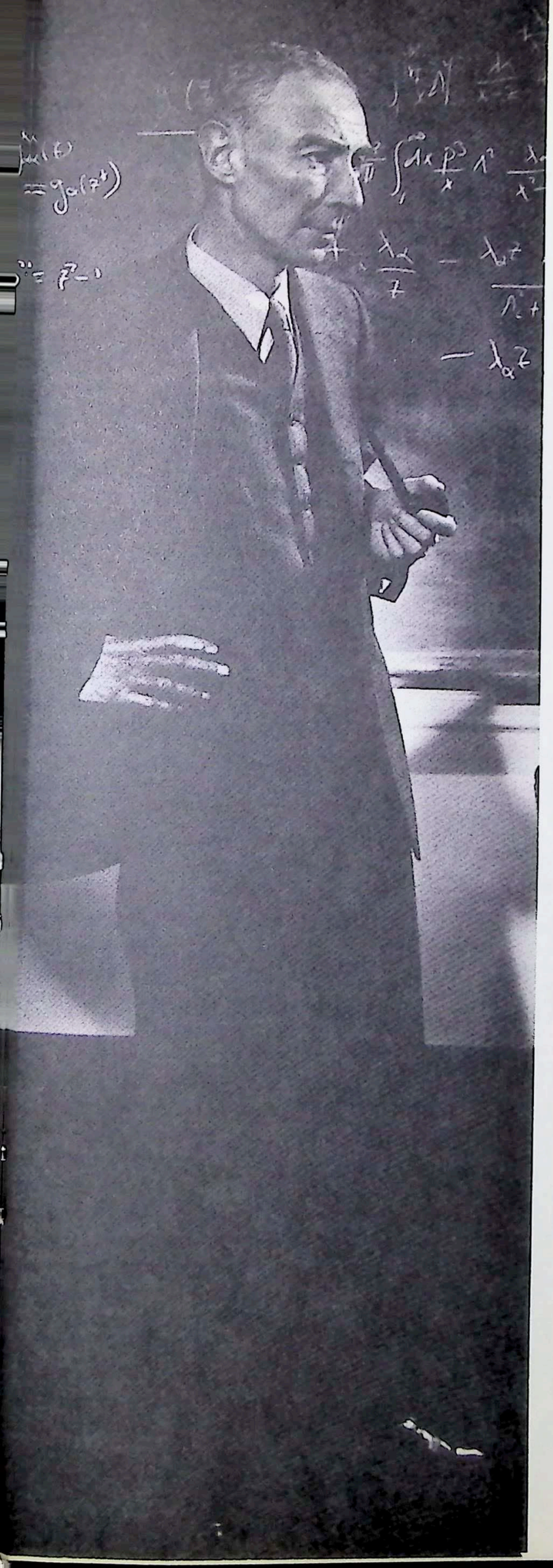
But today, no mind is capable of such accomplishment unaided. The facts are too many, their variety too great, their complexity frequently too rich for ordinary comprehension. Yet, the need was never greater for a broadly informed citizenry, capable of understanding the major developments of the age and their relationship. With the facilities available, the means must be found for reconstituting the Athenian and Florentine ideal in a twentieth century context. What are these facilities?

The new instruments of information, with their speed, flexibility, and almost limitless capacity are ideally suited to the task of distributing the knowledge of both art and science on the broadest possible scale. Television, for example, has exposed millions to experience in the arts that range from great drama and music to the painting of Michelangelo or Van Gogh and the sculpture of Moore or Giacometti. Through television, the mass audience also has become aware of the challenges of conservation, the problems of air pollution, and the progress of medical science. The viewer is as familiar with space exploration as he is with the travels of Bob Hope.

Though it is even younger than television, the computer is now being used to simulate complex social and human systems and to shed light on such problems as overpopulation and juvenile delinquency. The same instrument that can plot a space shot at the moon also has become a research assistant to the arts. Computers are helping to prepare a measure-by-measure profile of each of Haydn's 104 symphonies, to collate the five different versions of a Henry James novel, and to edit a concordance to the poems of Emily Dickinson. Indeed, the computer is providing the modern forum for psychologists to work together with engineers, sociologists to collaborate with economists, and literary scholars to blend their labors with mathematicians. The electron, in brief, is removing the barriers and rebuilding the bridges between the sciences and humanities.

In a few years, the range of electronic information will be broadened further by new systems that will provide virtually unlimited channels for the flow of information from any point of origin to any place of reception. Laser "pipes" between major metropolitan centers will have a capacity for transmitting information millions of times greater than the most advanced systems in use today. Microwave channels and communications satellites will beam television, telephone, and facsimile directly into the home, the office, or school. No sight, sound, printed word, or image will be beyond the immediate reach of the listener or viewer, and computers will provide instant translations from any foreign language. The total panorama of man's knowledge and experience will extend before us in infinite variety.

We have the opportunity to create such an Age of Enlightenment in our own century, and this is our greatest challenge—to keep faith with the past while we keep pace with the future; to maintain the human heritage in an era of vast technological change. It was one of the greatest scientific minds of all time, Albert Einstein, who said: "Man is here for the sake of other men." Let us go on learning, for to cease learning is to cease existing—and today this applies to individuals as well as to nations.

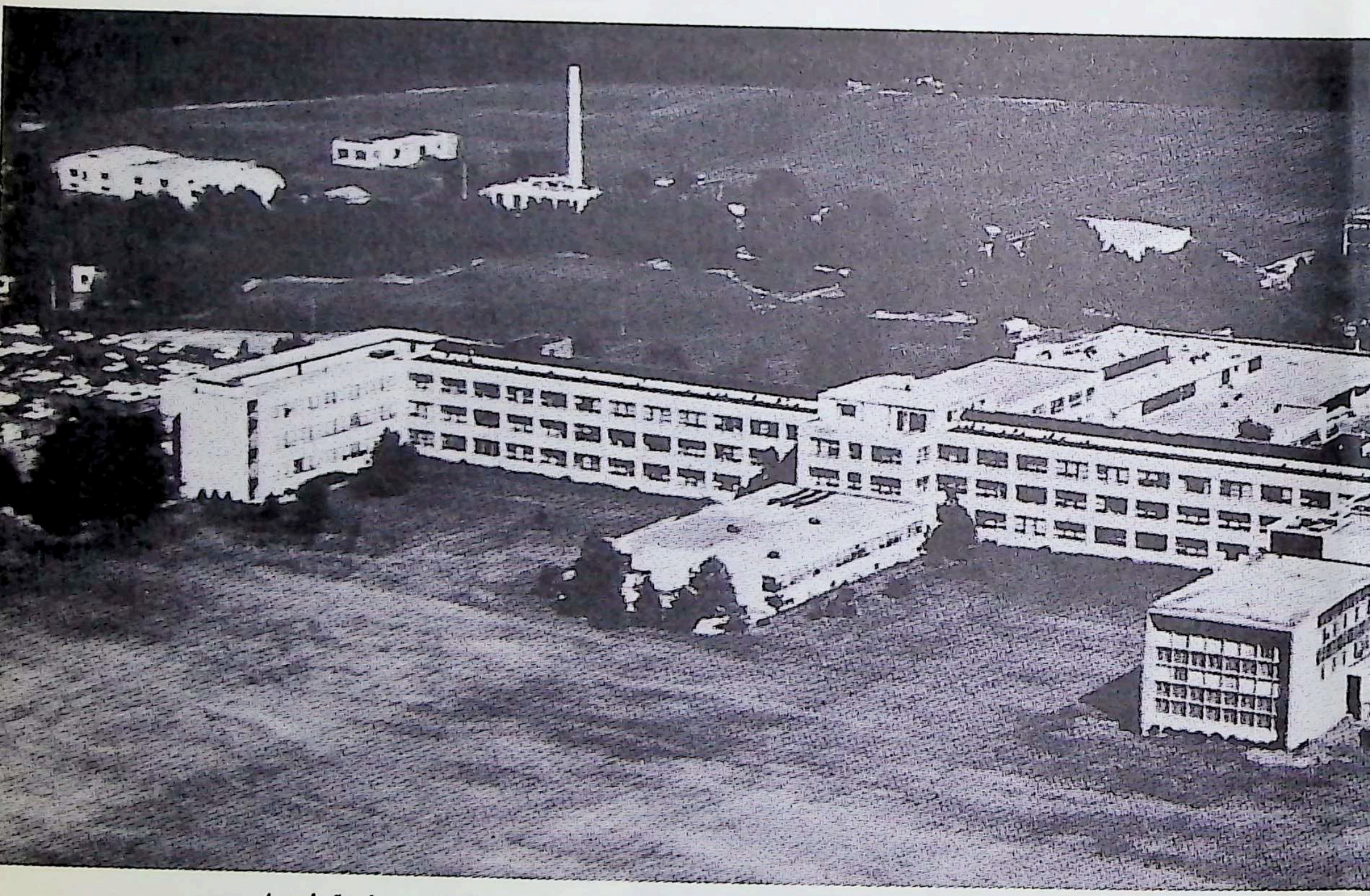


David Sarnoff is a man of exceptional intellectual power, with a thorough understanding of the complex problems of the modern scientist. Men—rather than books—have been his teachers. Ideas—rather than things—have given strength to his leadership. His vast knowledge has stood him in good stead. He has not only taught men of science much—he has led them away from the pitfalls that lurk behind half-truths and superficialities. He respects tradition only as it concerns the welfare and progress of mankind. He never loses sight of the supreme end of democracy: the perfection of the institutions that exist for the prosperity and happiness of humanity. The heights which David Sarnoff has reached today are but the steppingstones to bigger things for tomorrow, for he has a sacred devotion to his mission in life.

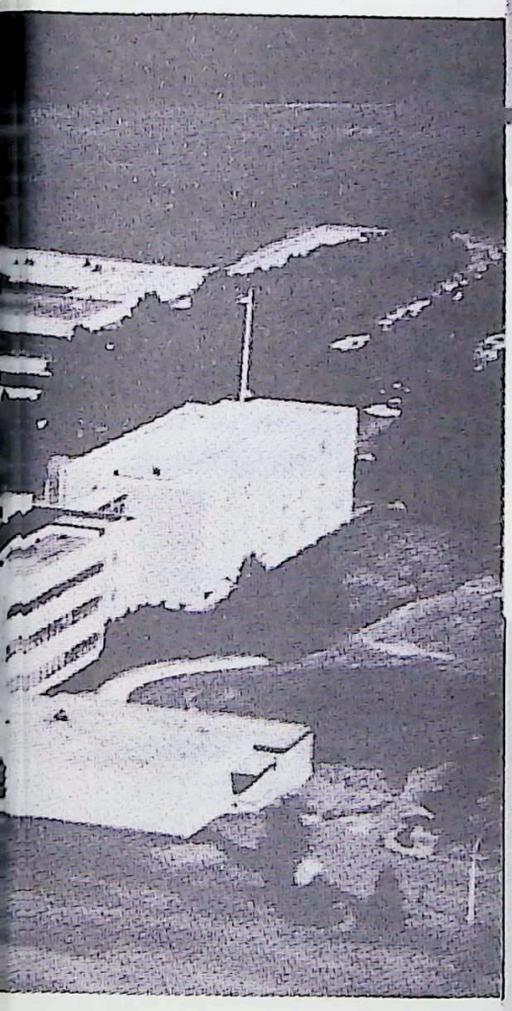
Robert Oppenheimer

ROBERT OPPENHEIMER
*Scientist, Physicist and Educator*

# THE WISDOM OF SARNOFF ON *Research*



*Aerial view of the principal facility of RCA Laboratories, the David Sarnoff Research Center at Princeton, New Jersey.*



*On the occasion of General Sarnoff's 45th Anniversary in radio, September 27, 1951, the Princeton, N.J. laboratories of RCA were dedicated as "The David Sarnoff Research Center." At that time, a bronze plaque was unveiled (below), commemorating the event.*

## DAVID SARNOFF

COMMEMORATING THE FORTY-FIFTH ANNIVERSARY OF DAVID SARNOFF'S ENTRY INTO THE FIELD OF RADIO ON SEPTEMBER 30, 1906, THIS PLAQUE IS DEDICATED BY HIS ASSOCIATES IN THE RADIO CORPORATION OF AMERICA AS A SYMBOL OF THEIR ESTEEM AND ADMIRATION.

AS A PIONEER OF WIRELESS, HE HAS CONTRIBUTED IMMEASURABLY TO THE DEVELOPMENT OF RADIO, TELEVISION AND ELECTRONICS AS NEW SERVICES TO THE NATION AND TO THE AMERICAN PEOPLE.

A CREATIVE CRUSADER OF PROGRESS ENDOWED WITH A PENETRATING VISION, DAVID SARNOFF HAS CONTINUALLY LED THE WAY ACROSS NEW FRONTIERS IN SCIENCE, ART AND INDUSTRY TO MAKE THE UNIVERSE VIBRANT WITH INTERNATIONAL COMMUNICATIONS.

THESE LABORATORIES, THE RCA VICTOR PLANTS, THE RCA WORLD-WIDE RADIO CIRCUITS AND THE NBC RADIO-TELEVISION NETWORKS, SYMBOLIZE HIS FAITH IN SCIENCE, HIS CONSTRUCTIVE PLANNING AND ENDURING ACHIEVEMENTS.

DAVID SARNOFF'S WORK, LEADERSHIP AND GENIUS COMPRISE RADIO'S PREEMINENT RECORD OF THE PAST, TELEVISION'S BRILLIANT PERFORMANCE OF THE PRESENT, AND A RICH LEGACY IN COMMUNICATIONS FOR THE FUTURE.

THIS LABORATORY OF RCA IS NAMED
THE DAVID SARNOFF RESEARCH CENTER

SEPTEMBER 30, 1951

Just as many of today's basic inventions were discernible in the great awakening of science in the eighteenth and nineteenth centuries, so today, in our research laboratories, we can see the shape of things to come—technological marvels that promise new forms of energy, new controls and new materials for the future.

Basic research, the quest for new knowledge about natural phenomena, is the very foundation of engineering and technology. It cannot be neglected without ultimately weakening our entire scientific edifice. In the present complex world of technology, no country can maintain a position of leadership unless it is willing to furnish a favorable climate and reasonable support for basic research.

In recent years, the pressure for quick results has focused our main attention on applied research, on engineering and on immediate requirements. As we apply the fundamental knowledge we have acquired, the need for more such knowledge becomes apparent. Basic research is a continuing task of exploring the unknown. The very exploration uncovers new and challenging problems and possibilities. It opens up new vistas for advanced knowledge leading to still greater accomplishments. The process is regenerative. Today there is a growing realization of the dangers of neglecting this task and the scientific community has spoken out vigorously on this score.

We must develop an environment in which talented scientists can apply themselves to long-range objectives without feeling compelled to fill immediate prescriptions for "hardware" in order to qualify for financial support. It is vital that the American people should have a clearer appreciation of the role of science and the function of the scientist in our society. This would raise the calling of the scientist to a higher level in the public mind, and an enlightened and sympathetic public opinion is indispensable in this Space Age.

Remember that Einstein did not create the theory of relativity and find out what he did about the atom with large appropriations and great laboratories. His theories and discoveries came from his mind. And that, I think, teaches us that great discoveries and great inventions are not always the product of great laboratories, great institutions, and large amounts of money. They are the results of great men with great minds.

A member of the press came up to me and asked: "Why does RCA show all its developments while they are still in the research stage? Aren't you giving away trade secrets? Are you protected by patents?" I replied that I do not know whether these new developments are covered by patents or not. Our philosophy of research is not based upon concealing our projects from our competitors, but rather upon the idea that basic knowledge should be made available as quickly and as widely as possible so that the entire industry can benefit.

There are some tailors who can make a beautiful suit of clothing to fit the body perfectly. But in their concentration upon tailoring they leave the job of sewing on the buttons for another day. Then somebody comes along, duplicates the design, sews on the buttons, and sells the suit for a good price. Well, sometimes it's like this in electronic research. You can't always be first with the buttons.

Our policy has always been to make the results of our research work public just as soon as it can be done and often before the buttons are sewed on. We try to point out the many paths along which the whole industry can travel independently. We feel that such a policy serves to revitalize the industry, to infuse it with new enthusiasm and to provide new services and products for the public. And we believe that what is good for the public and the industry is good for RCA.

We, at RCA, are not worried about whether somebody else will get there first, because the fields of electronics are broad enough to offer vast opportunities for everyone that can contribute to its practical development. The pioneer may not receive the full measure of reward to which he is entitled but if there were no pioneers there would be no reward at all for those who lead or those who follow. Pioneering is the spirit of America and we in the RCA family have been raised in that spirit.

Over the years, I have seen hundreds of new products encounter obstacles —both natural and man-made—and I have seen the really worthwhile products surmount those obstacles. Whenever you introduce something drastically new and different, some of your competitors will follow a stereotype: First, they will laugh at it; then, they will attack it; then, they will copy it!

In America, because of our strong pragmatic bent, effort in scientific research has been heavily focused on applied research, on engineering and immediate usefulness. Not enough attention has been devoted to pure or basic research. In consequence, there have been serious lapses in the fundamental knowledge from which technical accomplishments flow. To put the matter at its simplest, practice has tended to get priority over theory. Exploration and discovery have usually been judged less by what they added to the treasure-house of knowledge and understanding than by what they added to industry and everyday life. The scientist devoted to basic inquiries into the unknown has been given relatively little credit and, certainly, not enough cash.

Today there is a growing realization of the dangers of neglecting pure research, but it is still not easy, either in industry or government, to justify increased appropriations. One still meets the question, "Of what value is a program of abstract science without a definite and 'useful' goal?" More and more of the men responsible for research are beginning to acknowledge the fallacy of that question. It is becoming increasingly

clear to them that the pursuit of knowledge as an end in itself, the passionate urge to vanquish some segment of ignorance, is justified, in the long run, even in terms of utility.

Some years ago, few in aviation saw much point to basic studies of the upper atmosphere, far beyond the ceilings of the highest flying airplanes at that time. But soon enough the development of aircraft capable of climbing to vastly higher altitudes made what had been pure research vitally pertinent and practical. In radio, to cite another example, we are constantly having to use frequencies before we know their characteristics and behavior as electro-magnetic waves in space.

The gulf between fundamental and applied knowledge in many fields is growing too wide to be ignored. The scientific community has spoken out vigorously on this score. Because pure science is the foundation of engineering and technology, it cannot be underrated or neglected without ultimately weakening our entire scientific edifice.

I like to think of research as the distance we must travel between the problem and the answer. In my own field, I have seen this distance traversed many times against many obstacles—both natural and man-made —which at the time, seemed insurmountable.

Initially, the idea of broadcasting programs of entertainment, news and information by radio into millions of homes was ridiculed by many as commercially impractical and technically impossible. Yet, sweeping advances in research, made radio broadcasting a household reality. The idea of adding sight to sound, through television, was scoffed at when it was first suggested. Yet, again, fundamental strides in research transformed idea into actuality—first in monochrome and then in color. Understandably, therefore, I have an abiding faith in research and an abundant confidence in what it can accomplish, not only in electronics, but in other areas of science and medicine as well.

The United States in recent years has contributed a substantial share of the world's finest creative thinking. It excels today in the experimental approach, in the richness and variety of its facilities, in unrivaled opportunities for putting concepts into application.

The United States, largely because of its own swift advances, is gradually depleting its storehouse of fundamental scientific knowledge—the springboard for further technological progress. The demand for basic principles seems to be outpacing the supply. Through more extensive basic research, we must expand our scientific knowledge, and channel its flow into other areas of the world for the support of freedom's needs. This can best be accomplished, I believe, through the creation of an organization which I would call the Free World Community Of Science—an

organization where competence is the only visa, and capabilities are fitted together for maximum results without regard to nationality. The United States might properly take the lead in establishing such an organization, which initially could embrace the nations of Western Europe, North and South America, Australia and Japan. Any countries which permit free scientific inquiry unhampered by political ideology, would be welcomed.

A Community of Science could include scientific leaders in the major areas of the physical and life disciplines from each participating nation. Established on a permanent basis, it could be responsible for proposing key research areas, initiating specific research and development projects, coordinating the resources essential to their implementation, and creating, wherever desirable, specialized international research institutes. It should function with a minimum of political direction, and with its financial support contributed by the member nations.

Many organizations could play a vital role in the development of a Community of Science; first by proclaiming their support of it and then by counseling on organizational problems during the formative phase. It would also be within their province to propose suitable projects, to recommend the most qualified scientists and engineers, to help evaluate progress, and to suggest promising avenues of exploration. There are many organizations here and abroad which possess the qualities of technical competence, objective appraisal and political independence necessary to make useful contributions.

Even today we could place certain areas of research under a canopy of common Free World scientific interest—areas which range across the natural laws of life, matter and energy, and involve some of the most critically pressing human and physical problems of our time. In each area, breakthroughs would change human life for the better and would manifest to all mankind the scientific leadership of the West.

We have begun the assault on the innermost mysteries of the life process —decoding the nucleic structure of the living cell, its activities, differentations and transmitted characteristics. Knowledge of these basic life functions might make it possible ultimately to alter or modify cellular structures. This could lead in turn to the elimination of bacterial or viral diseases, and conceivably to more useful strains of plant and animal life.

In our own area of primary interest—communications—we are now in the planning and early development stage for a cosmic system of interconnected high-level synchronous satellites, low-level satellites, ground stations and networks. Such a system will enable us to furnish every type of communication to every place on earth, to space vehicles and to the planets beyond. Whenever man ventures from this planet, science is challenged with the supreme task of providing him with the means of

seeing and talking with his fellow men wherever they may be.

Two-thirds of the peoples of the earth live in areas that are water-starved. For millions of them, the presence of a few feet of water spells the difference between life, bare existence, or death. The nations which offer an efficient, low-cost process for large-scale purification of salt or brackish water will possess a weapon as potent as space ships in the battle for men's allegiance.

Barely one-sixth of the world's people are well-fed, and nearly half exist in a state of subnutrition or malnutrition. In the areas where food deficiencies are greatest, the rate of agricultural production has been slowest. In twenty years the population of the earth will increase by one billion, and forty years from now it will total six billion. For every plate of food on the table today, there must be two plates by the year 2000—and most of that second plate can come from the world's oceans.

Acre per acre, the oceans can sustain at least as large a plant crop as the land. Yet, the harvest of the sea today provides less than one per cent of the human diet. The oceans offer an immediate challenge to a proposed Community of Science for improving food supplies by transforming fishing from a nomadic pursuit to an organized farming activity, including the scientific processing of highly nutrient algae and plankton for food purposes.

Research in atomics, electronics and other fields, is now providing us with the means to convert solar energy, fossil fuel energy and atomic fission energy directly into electric power. And through further research we shall ultimately learn how to make practical use of nuclear fusion energy. When that day comes, we shall be able to tap the limitless energy sources in the oceans.

Before too long, many isolated parts of the world will have sources of electricity that will not require large central power stations and extensive transmission systems. When we learn how to convert all forms of matter into energy for practical uses, we will have at our disposal the maximum force in nature. It will then be possible to cleave new coast lines, level mountain ranges and transform the Sahara or our southwestern deserts into irrigated gardens.

To quicken the pace of scientific explorations, I suggest the establishment of an international data processing center to assemble, digest, translate and make available promptly the essential data contained in the volumes of technical papers being published around the world. Annually, the total of such papers will approach sixty million pages. Concealed in this mountain of information are thousands of ideas for new materials, products and processes that could be invaluable to our progress in science

and technology. I realize that the implementation will require time, effort, a degree of willingness to forsake parochial interests, and a firm faith in the future of free nations. While it would be necessary, for security reasons, to exclude certain activities of a scientific nature that relate to national defense, this would not contradict the broader and peaceful purposes of the new scientific alliance.

The concept of isolation in science is illusory and in the end self-defeating. We can no longer afford the luxury of American science, or British, French, Italian, or German science, if the individual parts are smaller than the sum. We must mobilize all of free science into the race for supremacy over the forces governing the universe. We cannot afford to fall behind in this race. The Communist challenge to the Free World on the military, economic, political, and psychological fronts demands that we hold first place in science and technology. Four centuries ago, Francis Bacon said: "Knowledge is power." Amended for the twentieth century, his words might read: "Scientific knowledge is world power." The dominant task that we face in the next fifty years, is to help translate scientific knowledge into power—power that can safeguard human freedom and justice, that can make life more rewarding and more secure for men everywhere.

Research has recast the pattern of national progress. New adaptations of mechanization and automation by research teams have increased productivity so that the average worker turns out six times as much in an hour as his great-grandfather did. If the present tempo is maintained, workers a century hence will produce as much in a seven-hour day as they now do in a forty-hour week.

Developments in the great laboratories of America have written new chapters in the progress of science. Antibiotic drugs, electronic computers, synthetic textiles—all products of research—improve our health, increase our commerce and provide us with comforts. Unfortunately, however, there are men in the world who do not confine this new found power of science to beneficial pursuits.

In recent years our scientific emphasis has been heavily concentrated in applied research, in engineering, and not enough attention has been devoted to pure, or basic research. As a consequence, there is, in a number of important areas, a shortage of the fundamental knowledge that is the raw material for engineering developments. Therefore, we must develop more fundamental knowledge. The safety and progress of the free countries of the world depend upon it.

The scientist bent on basic research is usually given little credit and, frequently, lacks the money and tools to continue his search of the unknown. It is not easy in industry nor in government, to justify appropriations for pure research. It is hard to answer the question, "Of what

value is a program of abstract science without a definite goal?" It is important, therefore, that we cultivate "science appreciation" much as we do "music appreciation."

The spearhead of pioneering and the gateway to progress is research. From it stems new knowledge, new inventions, new products, new services. It brings renewed vitality to business, increases opportunities for employment and provides higher standards of living for the people.

All my life I have been fascinated by the tremendous forces that can be harnessed for the benefit of mankind and have been more interested in what can be built than what has been built. There is great stimulation to the mind, and satisfaction to the soul, in looking for new frontiers that point the way to human progress.

Research is a creative effort that enlarges man's horizons and leads him onward toward new achievements. Research has given America the economic strength that is essential to its national security. As such, it is a bulwark of peace. Those who accept the challenge of research to competition gain a tremendous advantage over those who disregard it or entrust pioneering in science to others. In a sense, the pattern of modern life is largely the product of scientific research and technological development. We must face the fact that we live in a scientific age. We live in a period that has bridged time and distance and put the atom and electron to work.

We are harnessing the forces of nature, but in so doing, we have also created social and political problems that leave many people with a feeling of insecurity. So we find the world presently struggling with problems that are centuries old, but which have been brought into sharp focus by science and technology, by two World Wars, and by modern methods of communication and transportation that have shrunk the world into a small neighborhood. The work done in the research centers of science may, to a large extent, determine the outcome of that struggle.

It has always been true that the things men live with largely determine the ideas men live by. When the Western World learned how to use gunpowder, it meant the beginning of the end of the feudal system. When Eli Whitney invented the cotton gin, it was the beginning of the end of slavery. When the tractor and the harvester and the reaper were developed, we began to see a trend toward larger farms. The automobile changed the pattern of rural life. Radio and television have changed many of our ways of daily life, and bid fair to change the pattern of our political life.

As we face the challenge of these times, we can be sure that the way we are going to live—the kind of economy and the kind of government we

are going to have—will be determined largely by the things industry produces and the use that will be made of them. These things are the end products of research. I am not preaching a materialistic doctrine. We are all well aware that there is a spiritual factor that enters into this equation, and perhaps it is the most important factor of all. Many things have been produced in the course of history that had great potentialities for good, but some of them were used to destroy man, rather than to benefit him. We must always remember that nothing we produce is either good or bad unless our use makes it so.

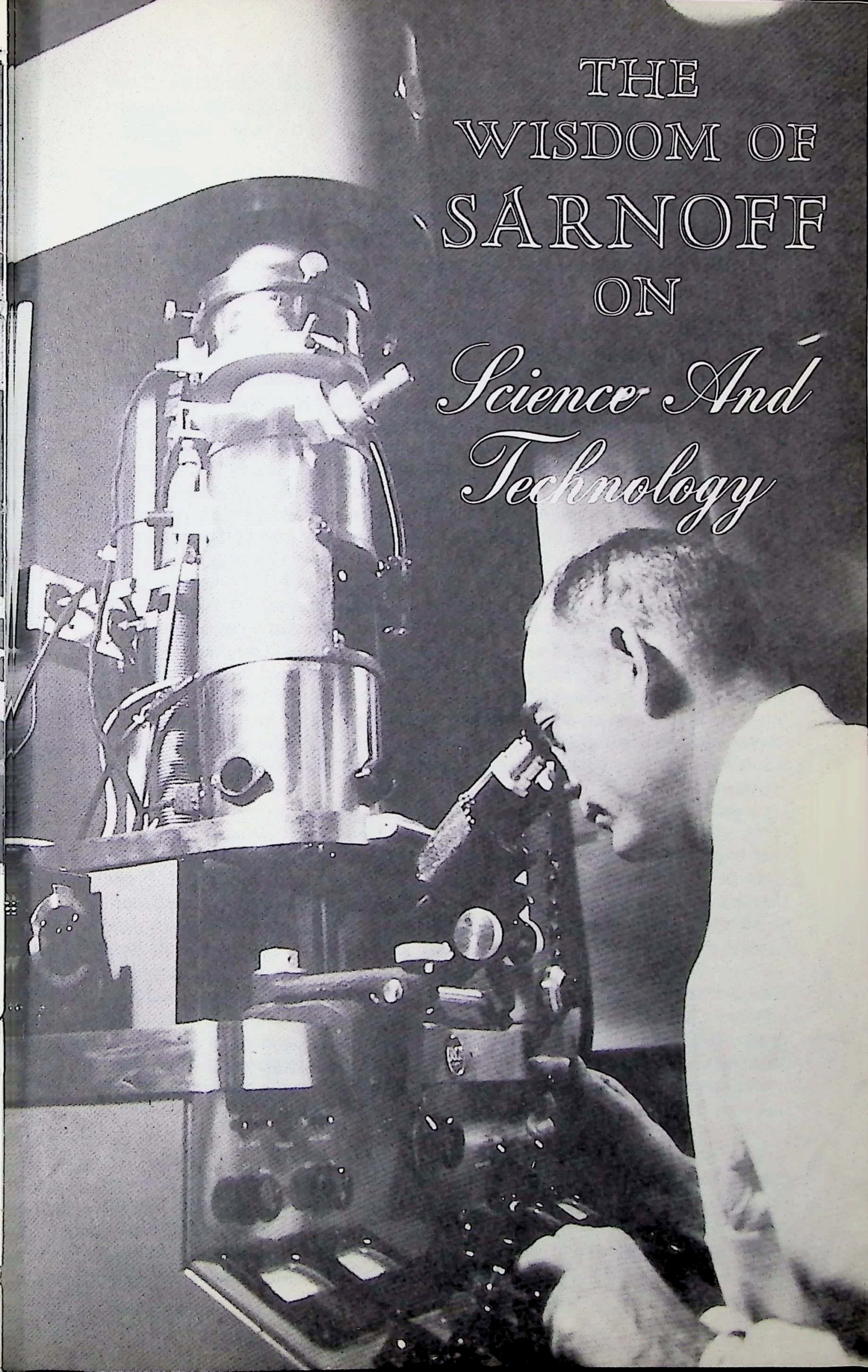
Those of us who create, produce, and distribute the world's goods have a responsibility to do all in our power to see that they are put to good use. The wonderful thing about research is the more of it you do, the more of it there is left to do. Like the Horn of Plenty, it is never empty. It is like hunting a word in the dictionary. Each word is defined in terms of other words. So, when you seek a definition, you are inevitably led to another word that suggests new ideas. Just so, each piece of research opens new fields for further exploration. In the words of Dr. Samuel Johnson, "The future is purchased by the present." And I know of no better way for industry, whether in America or in Europe, to assure its future than to join wholeheartedly in the full utilization of scientific research for the common good.

Pioneering and scientific research are the blood and the sinew of industry, providing the basis for versatility and vitality. And their work today—is the promise of tomorrow. They give America economic strength and increase our national security. They lead to new products and services, cultivate prosperity and improve the health of the nation. Science, through research, has a unique way of edging up to an existing industry or business to completely revolutionize routines and operations, to increase their safety and productivity and to provide a better return for labor on its effort and for capital on its investment.

From the broad viewpoint, our whole pattern of life—our homes and clothing, the automobiles, planes and trains we travel in—are all products of scientific research. And our social, political and economic institutions—even the conflicts involving them—are affected by that research. We must face the fact that we live in a scientific age. We live in a period that has bridged time and distance. We have harnessed the forces of nature so that life is easier for more people than it ever was before. But in harnessing those forces, we have also created problems that leave many people with a feeling of insecurity. So we find the world presently engaged in a great ideological struggle.

Certainly we can accept the basic truth that nothing ever stands still. Our country, our civilization, our business, must either go forward, or fall back. Today, science and industry are linked by arteries of progress and their lifeblood is technical research. Without continued pioneering and research, those arteries would harden.

*Anton van Leeuwenhoek (1632-1723), Dutch microscopist and father of microbiology, was among the first to see living microorganisms. He was first to report having seen "animalcules"—protozoa and bacteria—and to confirm by direct observation circulation of the blood. While he did not receive a scientific education, he had a natural talent for careful observation and made many important and interesting discoveries. He made his own microscopes and they were exceptional instruments despite their simplicity. At his death it was disclosed that he had built 247 microscopes and had designed 419 lenses. His varied microscopical discoveries created a sensation and exercised a tremendous influence upon scientific thought of the period. Though 200 years elapsed before practical application of his discoveries contributed to medicine, his work laid the foundation for modern medicine's tremendous century-long onslaught against diseases caused by bacteria and other microbiologic entities—a campaign which has saved millions of lives.*



# THE WISDOM OF SARNOFF ON *Science And Technology*

Technology, the common hoard of man's tools and techniques, has appropriately been called our "primary resource." Without it, all other resources would be economically stagnant. With it, all other resources can achieve startling new dimensions of usefulness.

We have heard disquieting admonitions that mankind is using up its precious stock of raw materials at an alarming rate. Yet even as these resources are being consumed, new and better ones are becoming available through increased knowledge and improved technology.

The scientific creativity that produced the awesome atomic and hydrogen bombs can also give the world all that it needs in the way of energy. It will, in time, be possible for us to extract atomic fuel from relatively inexpensive materials, making nuclear power both plentiful and economical. The significance of this becomes obvious when we realize that a single pound of uranium is capable of releasing more energy than 1500 tons of coal. In the not-too-distant future, the atom will supply the power for most of our ocean-going ships, our airplanes and even trains and factories. It will light, heat and cool houses, and run our television sets and home appliances.

Through advances in technology, the energy of the sun's rays also will eventually be harnessed to serve man's economic needs. The solar energy reaching the earth in a single day is equal to that released by two million war-time atomic bombs, and now we are learning how to channel it to our uses. This form of energy should prove especially important to the underdeveloped tropical regions where solar power is super-abundant, but where countries cannot afford adequate fuel and power of the existing types.

Our improving technology will give the world a vast array of new materials to meet almost any specifications that man can envisage. New plastics, ceramics, lubricants and categories of substances yet unnamed will become available for personal and industrial uses.

New scientific methods and techniques will greatly expand man's food resources, thus helping to eliminate the ghastly specter of famine in many parts of the world. These new advances will open the way to an era of relative economic abundance, freeing more and more people from the numbing pressures of poverty and thereby, no less important, cancelling out a main cause of social discontent and disorder.

One of the most far-reaching of our new technological developments is automation. We have so far seen only the beginnings in this field. Automation promises to free man at work from drab routine and to give him ever broader scope for the exercise of his highest skills. It promises more jobs calling for those human attributes, such as imagination and judg-

ment, that technology can never duplicate. The result is bound to be a massive upgrading of man's skills and his joy in labor.

Scientific and technological developments offer the exhilarating prospect of wider industrialization, higher standards of living, and a more satisfying life for all mankind. As Sir Winston Churchill so aptly phrased it: "Modern science is standing on tiptoe, ready to open the doors to a golden age."

We must be ever mindful that the triumphs of science and technology can be wiped out by forces of destruction. Our times have been called times of continuing crisis. The word "crisis," in Chinese, is a combination of two symbols. One is the symbol of "opportunity." The other is the symbol of "disaster." It is for mankind to decide which of these will be our destiny.

The possibilities of science offer the human race the chance to achieve a finer destiny. What we need most is a determination, rooted in spiritual faith, to apply our new knowledge and techniques to peaceful pursuits. The answer to the question: "Will science make this a better world in which to live?" lies not with science and technology as such, but rather with each one of us as responsible individuals.

Modern science is on the threshold of what can be a golden age. It is young minds that will be opening the doors to this great new opportunity. They are fortunate, indeed, in having the opportunity to pursue studies under a political system that does not manipulate scientific inquiries for political ends. There are no strictures—scientific, political or otherwise —to impede the career aims that they, and they alone, elect. They are at liberty to seek and to find the truth as they see it, and this is the only atmosphere in which science can thrive and creativity flourish.

Has there been any time in history when teachers have not told students that the future was bright? Perhaps not, but that does not deter me from assuring the future scientific and technical leaders of this great nation, that the prospects for their future dwarf those of preceding generations. Today there are more scientists alive than the combined total of scientists in all the preceding generations of recorded history. Yet even they represent only a small percentage of the number of scientists who will be exploring the mysteries of the unknown twenty and forty years hence.

All nations now are eager to cultivate science and never were scientists in greater demand. Never has there been greater willingness to follow the onward and upward march of the exploring scientist; for only through adventurous thinkers can the search for new knowledge succeed. Without this knowledge, the world would stagnate as a pool without an inlet. Neither would there be an outlet for its progress.

We who are veterans in radio, as well as those in other fields of scientific endeavor, are continually encouraged by the fact that there are as many new frontiers of research as there were one hundred or a thousand years ago. The crossing of a frontier in science always leads to another. Each discovery, each invention spearheads a new and undreamed of advance. Today, through radio and electronics, scientists are finding encouragement to believe that some day they may be able to detour storms, to dissipate clouds and fog, to produce rain and snow, and thus measurably to control the weather.

Today the frontiers of science spread above and throughout the universe, far into unfathomed space—into that vast invisible fabric which separates the heavens and the earth. The sky is a canopy over untapped reservoirs of new knowledge. Man's thoughts have been given wing. He is challenged to explore the stratosphere and the ionosphere with the same imagination and persistence with which he has won scientific conquests on the earth and on the sea.

Scientists, especially mathematicians, for centuries have been enchanted by the immensities of time and space; by gravitation, by the propagation of light, the theory of relativity, by electromagnetic radiation and radioactivity. But laymen have looked into the heavens and referred to "the emptiness of space." They have described the vacuum tube as "a glass bottle full of nothing." Now, thanks to science, we know that space is not empty, and that a vacuum tube is far from being filled with "nothing."

New tools of science are opening man's eyes in the realm of the invisible. But we need not see to be convinced that science is a vivid reality beyond the range of human sight and hearing. Science works in no such narrow spectrum. We perceive evidence of this in new forces which extend the range of man's optic and auditory nerves. By radio, man now can hear even a whisper or the buzz of a bee across the seas. Through the electron microscope, he peers into the realm of the molecule and the atom. By television, he sees beyond the horizon.

Science is soaring to new altitudes. In the upper atmosphere there are new wonders of the future, new benefits for the welfare of all people, new power for industry and transportation. In the stratosphere lie swift routes between nations and broad highways to new continents in physics and chemistry.

The explorer who now seeks, as Columbus did, a new passage to India, or a Northwest Passage as did Sir John Franklin, must traverse high altitudes. The links to world union will be welded in space. Today, the air is the common passageway of mankind where once it was the land and the water. The air, of course, has been ever present, but man did not learn how to use it until the turn of the century when radio and aviation were born. As a result of the vision of Marconi and the Wrights, and

others who followed them, the air has become a common medium that brings nations together. By radio, Moscow and Chungking are as near to Washington as Cincinnati and New York. By airplane the great cities of the world are only hours apart.

Radio and television now span the gaps of the hemisphere, leap frontiers, ignore boundaries and cannot be stopped by any man-made political "curtain." For radio and television go everywhere—and through word and picture can bring information and understanding to all peoples of the world.

A nation that is complacent and ignores the swift advances of science courts disaster—for ignorance and weakness lead to destruction. Therefore, America must foster research, advance its industry and continually bolster its national defense with modern science. We must maintain our strength and thus help to preserve our national security. Law and order, based on strong foundations can best protect the peace. Our country staunchly believes in the United Nations and has given proof of its willingness to cooperate fully in efforts to achieve international understanding and world peace. But the United States must remain a mighty power so that its world-wide policies and its international relations are not based upon fear. Fear itself can destroy our freedom. Freedom of science must prevail. Research must be stimulated and advanced through the scientific training of American youth in government, industrial and university laboratories. The pursuit of science is a task that never ends.

The world needs a peace in which science will play the constructive role. Science in wartime proved that it possesses immense and dynamic power for good or for evil. It can advance or destroy civilization. The new forces which science has released must be made to serve the ends of peace. And the path to peace must be found by men of good will whose capacity for leadership is matched by courage, vision and imagination. Such qualities of heart and mind would recognize the need for organized research in the social as well as the physical sciences—research that reaches for higher altitudes and points the way upward in man's eternal quest for peace and plenty, freedom and happiness.

It is not enough for mankind simply to explore in the vastness of space for new material conquests. Man must also raise his social sights. At the new altitudes he must seek and find the faith and inspiration that will enable him to express the true purpose of science—which is to provide for all mankind a good life and a lasting peace.

The great challenge of our time is to match the capabilities of technology to the needs of humanity. In his mastery of the electron and the atom, modern man already has given us a glimpse of where technology can lead. He has invented satellites to carry him through space and circle the globe at twenty-four times the speed of sound. He has learned to

walk in space around the world in approximately ninety minutes. He has guided a satellite by remote control to a selected spot on the surface of the moon and televised its features back to earth. With this remarkable record of achievement, and with his continuing acquisition of new knowledge, is it too much to expect that man can also find the ways and means to fulfill the elemental needs of life for everyone on this planet? Surely, there could be no greater contribution to human welfare and world peace.

These are strange and troubled times. We are living in a world of conflicting ideas. The spiritual values to which we have always been devoted are under attack. Our basic ideals remain the same, but they are being subjected to a serious challenge, and man's relationship to man is in dire need of adjustment. We are clear about the ideals that we know to be true, but we are confused as to the means of attaining them. One of the reasons for this confusion is the fact that we live in a scientific age. Since the turn of the century, especially under the impetus of electricity and electronics, we have marveled at many new inventions. And with each new invention, our emotions are mixed with fear and hope as we watch its application for good or evil. In the short years of our lifetime, scientific growth has been so great that it has far outstripped man's wisdom for using the products of science only for the good of mankind.

We have been able to reduce time and distance. We live within the confines of a more intimate world than our ancestors ever knew. A radio message encircles the globe in a split second. An airplane crosses the ocean in far less time than between sunrise and sunset. The old frontiers have faded. In a very real sense we have brought mankind closer together. But in another sense, much of this scientific advance has been used to pit us against each other.

We must recognize that there are people in the world who would use the products of science to enslave and mislead and destroy their fellow men. This is a problem with which man has coped for centuries. Today, the problem is greater than ever because the enemies of peace on earth have more powerful weapons to work with. But if we recognize this threat to peace and our well being, all that science has given us can be used as potent tools to preserve and improve our civilization. We must learn to live together in harmony if there is to be peace on earth and good will among men. This is a battle for men's minds. If we are to win this struggle, we must convince people that the ideals which have guided man along the road of progress are the ones to which he must remain devoted. We face the problem of beating the big lie with the big truth. Fortunately, religion, science and the arts have given us the means with which to do the job.

Recent years have seen the emergence of great new sources of energy and new techniques of production. The split atom and the tiny electron are bound to bring about an even more fundamental revolution in our

modes of living—and bring it about more rapidly—than the Industrial Revolution touched off by steam and electricity. Physics, chemistry, biology and other sciences are in the full tide of their vitality. What they have already given us is sure to be overshadowed by what they have yet to give.

We are too prone to make technological instruments the scapegoats for the sins of those who wield them. The products of modern science are not in themselves good or bad. It is the way they are used that determines their value.

Anxious people who watch the march of science ask: "Will the scientific machines make this a better world in which to live?" Each man must himself give the answer to this vital question. For the answer depends upon man himself and not upon machines, for machines are not endowed by the Creator with minds and hearts and souls. Science alone cannot guarantee security for civilization. Yet the problems facing man cannot be solved without science. Sometimes it seems as if the Lord challenges man to use his intelligence. He makes some lands fertile, others arid. He hides coal and oil in the rocks and fish in the seas. He makes the electron and the atom infinitesimal and the radio waves invisible. But man has proved that he can harness these forces for useful purposes.

There will always be new problems to solve and new trails to blaze. New treasures in chemistry and physics will be found in nature's inexhaustible laboratory between the earth and the sky. Planes that soar into the sky to probe the secrets of cosmic rays, or rockets that carry automatic recording instruments into space are but feeble, short-distance efforts of man to penetrate the upper atmosphere. Radio, radar and television are more closely allied with nature than are mechanical planes and rockets that can travel in space. As we learn more and more how to use radio and television, we may discover new means of employing the waves to bring back to us important information that will solve problems for which we do not have the answers today.

The mystery story of the upper altitudes will gradually be revealed for man to read. New resources are to be found in space which some day may be captured and brought to earth to be harnessed or synthesized for the welfare of mankind. The chemistry of the upper atmosphere is an intriguing continent for exploration and may lead to new sources of energy. In the stratosphere lie swift routes between the hemispheres and broad highways to new knowledge in chemistry and physics.

My faith in the creative abilities of scientists and engineers has been boundless. At times I had more faith in some of them than they had in themselves. All they needed to increase confidence in themselves was the awareness that others believed in them and in their ideas, along with evidence of practical and moral backing.

On the ground, beneath the ground, and in the seas, nature holds untold secrets. Antibiotic drugs such as penicillin, streptomycin, aureomycin and terramycin have opened new frontiers for medical science. Some of these are derived from molds and others from the soil and the magic of synthesis. These drugs are saving countless lives and are prolonging the span of life. While the air and the soil challenge the scientist, so do the oceans. They teem with plant and animal life as well as chemical elements which can be extracted from the waters.

Among the most impressive accomplishments of the twentieth century has been the spectacular enlargement of food resources for the human race. The fact that it is as yet, in most areas, only a potential does not detract from its importance and its far-reaching implications for the future. Modern science and technology have so transformed farming in our country that already "The Man with the Hoe," the cliche of back-breaking toil, is fast disappearing. Machinery, artificial fertilizers, triumphs in biology and horticulture are wringing long-hidden treasures from the ever young earth. Even the oceans and the air are beginning to yield new harvests of sustenance for mankind. Having eaten of the Tree of Knowledge, man was condemned to get his bread by the sweat of his brow. But evidently there was a Divine mercy at the heart of that curse. For man has applied his knowledge to obtain bread with ever less sweat.

Advances in maintaining health and healing the sick have been truly spectacular. Entire categories of scourges, that used to be accepted as an inevitable part of mortal suffering, have been virtually banished in our own and in some other countries. The physician, with the chemist at his side, has conserved and multiplied the most precious substance of all—human life. The implications of this fact are startling. They deserve attention in any balance sheet of our times. It means that the span of life has been widened almost fifty percent in fifty years. And even that isn't the whole story. The extra years won for man, woman and child have been added to the period of maturity, when creative and productive forces have fullest play. It means many more years for achievement and enjoyment—in industry, the sciences, the arts; in the worlds of matter and spirit alike.

Nuclear physicists and engineers have turned the key that unlocks the incalculable energies confined in the atom. Though born in war and baptized in destruction, those energies are already being harnessed to man's constructive purposes, for production and transport and healment. This, the latest miracle, is so recent and impressive that we have not yet accepted it psychologically as we have accepted the miracles that went before.

In my lifetime I have witnessed extraordinary discoveries. The conquest of space by aeronautics and electronics has been matched by the conquest of the tiniest of all things—the atom and the electron. And amazingly

the infinite and infinitesimal have proved to possess a great deal in common, as if bound by the same laws. The microscope, no less than the telescope, has revealed unknown galaxies moving in tune to the same music of the spheres—a clue to the most awesome mystery of all, which is the divine unity in nature.

The twentieth century has been a period, one might say, when the worlds of the poet and the scientist have intersected, when the boundaries between the visionary and the practical have been blurred. Men's dreams are on drafting boards in myriad laboratories.

For the good of America and the world in general, the arts and sciences are challenged to work together and bring their respective talents and skills into focus. In effect, men of science and the arts must play on the same team and understand each other's signals so they can score together.

Today we are on the edge of new discoveries in the boundless realm of electronics. With a combination of electronics, supersonics and chemistry, we are on the frontier of a new science—Chemotronics—through which our scientists may learn the secret of creating many new products. Why should man let the heat from the greatest furnace—the sun—go to waste? Why should he let its light be dissipated? The day may come when research will discover how to bottle the heat and light from this great natural reservoir for man to use. For nature surely intends that man shall make greater use of these forces. Science will harness them so that the precious rays will be on tap for use at will, like electricity, water or gas.

This remarkable circumstance—liberty and science born and nurtured through the generations in the same community—is not a coincidence. Always and everywhere freedom and science flourish best in the same climate, each fortifying the other. They draw their vitamins for healthy growth from the same political soil.

There have been periods in history that saw advances in science despite the absence of democracy. But its most magnificent flowering, in the last century, has taken place in countries where liberty prevailed, especially in the United States. Surely this is no accident. Scientific progress rests, in the final analysis, on freedom of research—on the right of man to follow truth wherever it may lead, without fear and without inhibitions.

There have been no major scientific discoveries and inventions in totalitarian countries. The best they can do is to buy or steal, then adapt, the products of freedom. Behind the Iron Curtains, truth has been outlawed. It leads a secret and stunted existence in the underground of

men's minds. But science cannot prosper under such conditions, for it needs the invigorating air and sunshine of liberty.

Engineering is first of all a profession, a career—to put it bluntly, a way of making a living. I do not for a moment underrate that fundamental fact. But I wish I had the skill to convey to all the young men, now entering the world in which I have labored all my life, that engineering can be infinitely more than that. For some it will remain merely a trade, like any other trade. But for others, the more imaginative and courageous, it can be a noble and satisfying dedication. They will face the challenge and the opportunities of engineering with the same proud sense of fulfilling a vital public function that the best men feel in the fields of medicine, or law, or the arts. They will assume its responsibilities in a spirit of mission, in the awareness that they are starting out upon a great adventure.

It is the special glory of science that the more it accomplishes, the more remains to be accomplished. Every invention or discovery, far from narrowing down the perspective, opens up thrilling new horizons of exploration. Science, of which engineering is a part, is never fixed and finished. Its every achievement marks a new beginning. Though rooted in the past and the present, its thinking and its mood are ever geared to the future.

Men of science are wonderful people—too long neglected, too little recognized and too poorly rewarded. Their scientific skills and knowledge constitute a vital national resource. We must appreciate the great value of these skills, and we must learn to put them to good use. I gladly tip my hat to the men of science who have contributed so much to the prosperity of industry and the strength of our nation.

What men of my age have done and witnessed in the domain of science and engineering will seem primitive by contrast with what the youth of today will do and see done. This consciousness of worlds to conquer, it seems to me, is as important a part of a young engineers equipment as the things already learned from books and laboratories. Both the electron and the atom, as tools of mankind, are young like they. Whether they will be developed beneficently for life, or channeled largely for destruction and death, will depend primarily upon their generation.

My generation has not done so well that it can afford to lecture to youth. But at least we are deeply aware of our shortcomings. We know that the spirit of man has not kept pace with his technological and material progress. We can say to the young men and women who pick up the torch that science is not an end in itself but only the means to an end —that it is meaningless except as an instrument of human decency and human happiness. Its true purpose is to advance the progress of humanity.

# A Historical Gallery

# Of

# The World's Great

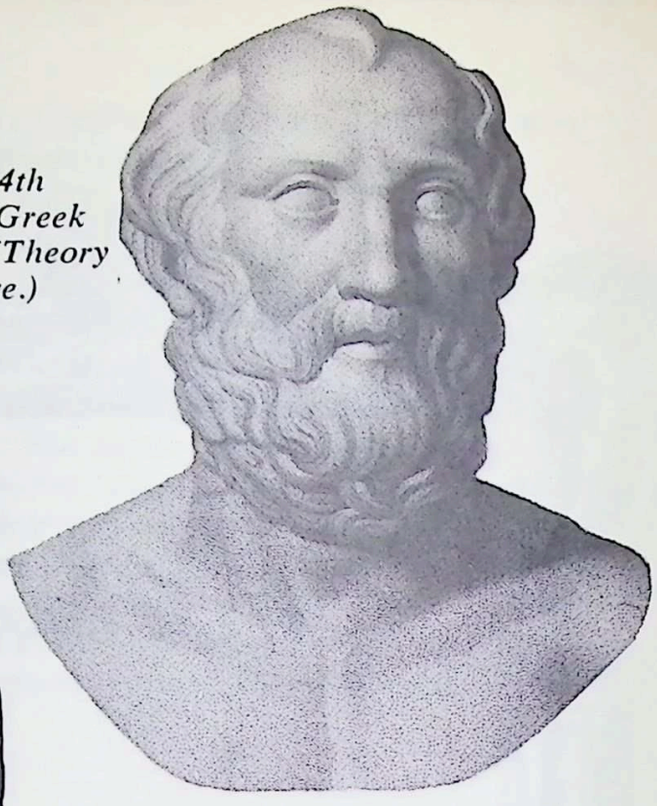
# Scientists And Inventors

# Of Wisdom

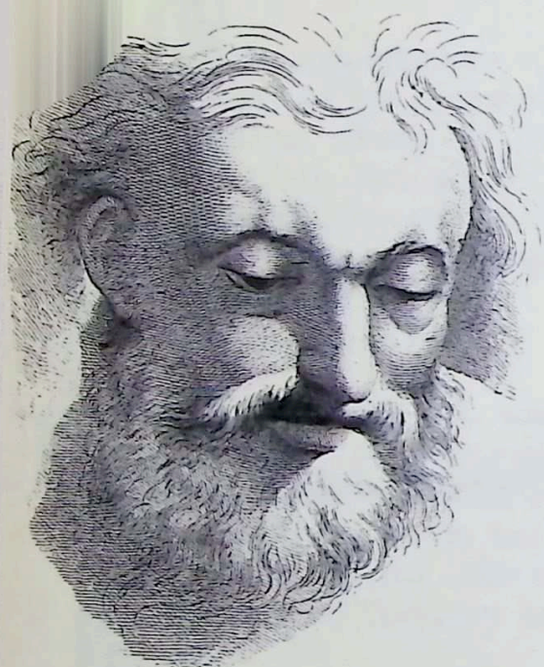
Only through adventurous thinkers can the search for new knowledge succeed. Without this knowledge, the world would stagnate as a pool without an inlet; neither would there be an outlet for its progress.

— DAVID SARNOFF

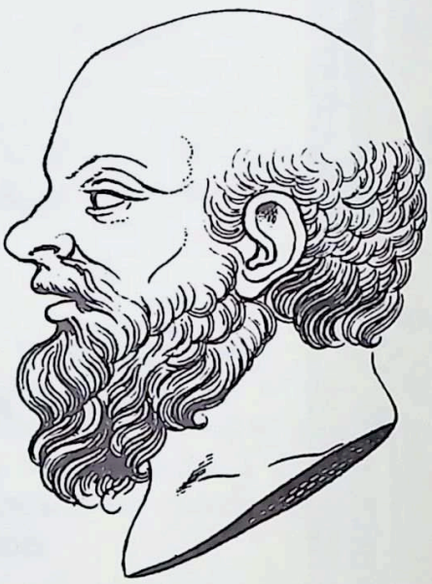
The learning and knowledge that we have is, at the most, but little compared with that of which we are ignorant.
—PLATO



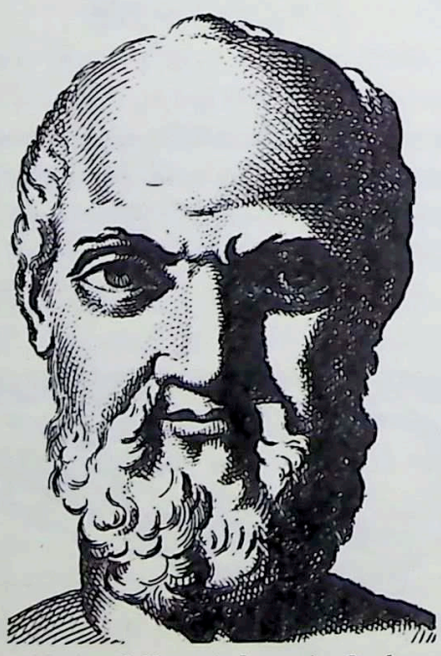
Plato *(right), 4th century B.C. Greek Philosopher. (Theory of the universe.)*



Ctesibius *(above), 3rd century B.C. Greek Inventor. (Fire engine; air gun; force pump; pipe organ.)* Eratosthenes *(right), 3rd century B.C. Greek Mathematician. (Measurement of earth; mathematical geography.)*

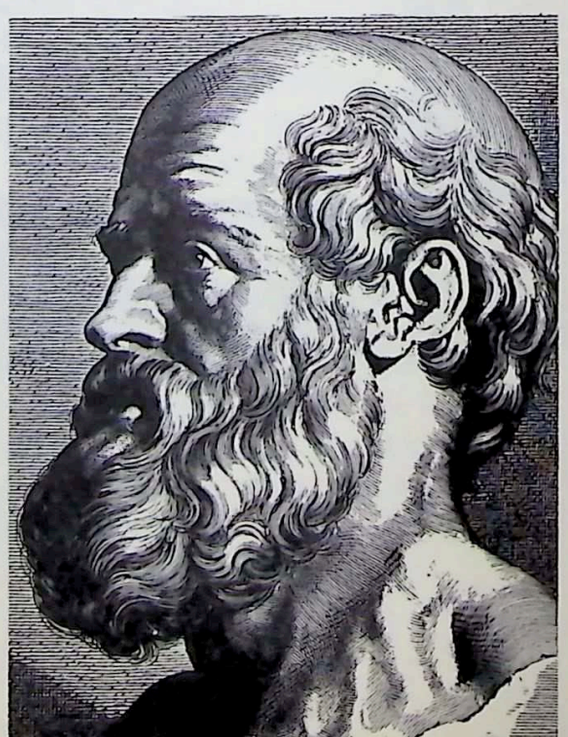


Thales *(above), 6th century B.C. Greek Scientist. (Geometry; eclipses.)*
Hero *(below), 1st century A.D. Greek Scientist. (Steam engine; pumps and syringes; water organs; gear wheel; spherical boiler.)*

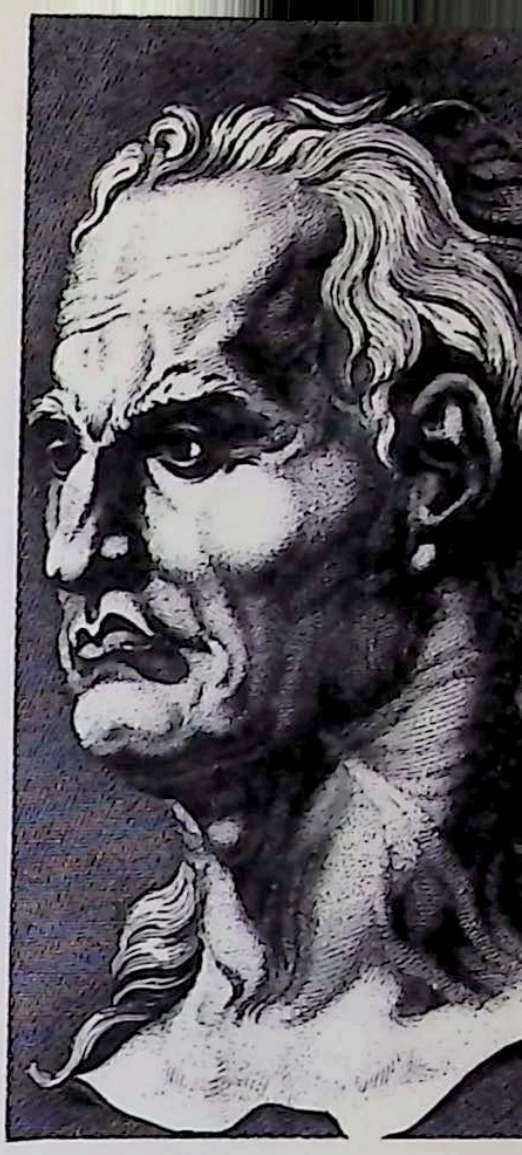


Hippocrates *(below), 4th century B.C. Greek Physician. (Procedures for diagnosis; medical ethics code.)*

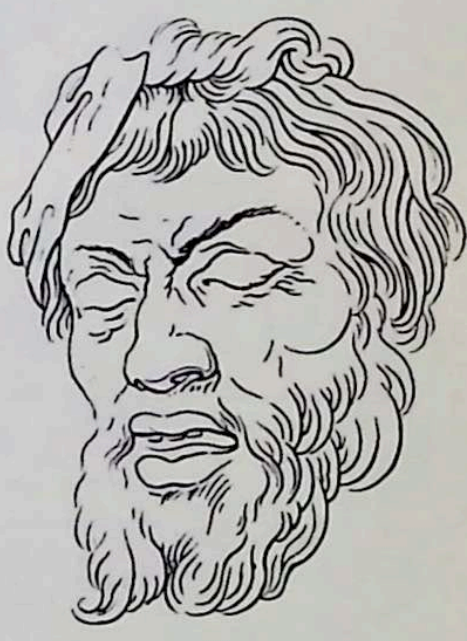
Herophilus *(above), 3rd century B.C. Greek Anatomist. (Post-mortem examinations.)*



Archimedes *(right), 3rd century B.C. Greek Mathematician and Inventor. (Principles of mechanics, hydrostatics, specific gravity; planetarium; screw; levers and pulleys; worm gear; concave parabolic mirror; number system; clockwork device; military machines.)*



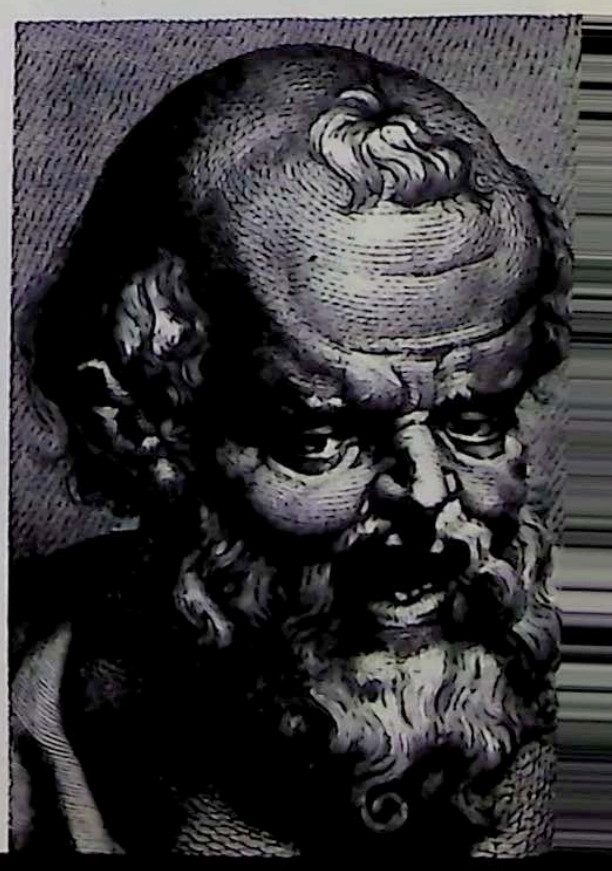
Galen *(above), 2nd century A.D. Greek Physician. (Theory of human anatomy.)* Aristotle *(right), 4th century B.C. Greek Philosopher. (Writings on natural science.)*



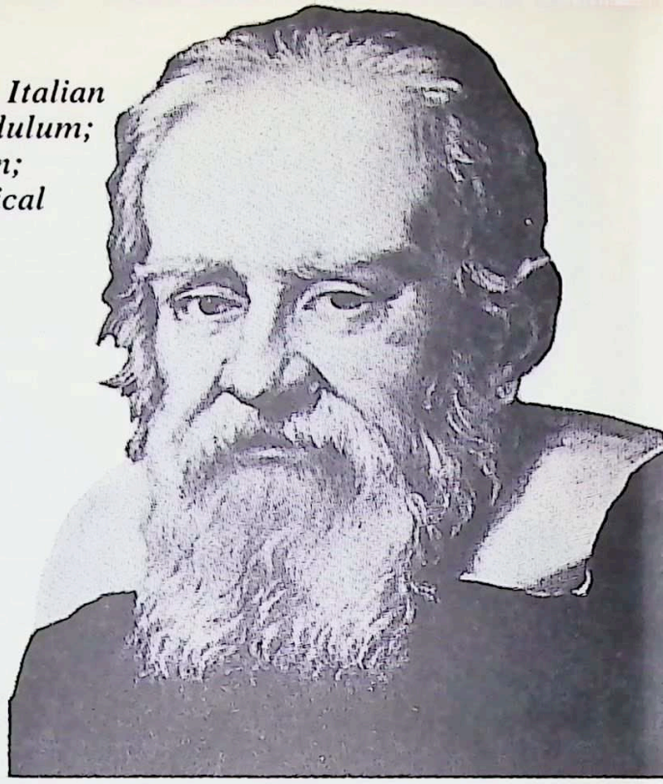
Euclid *(above), 4th century B.C. Greek Mathematician. (System of geometry.)* Anaxagoras *(below), 5th century B.C. Greek Mathematician. (Dualistic explanation of the universe.)*

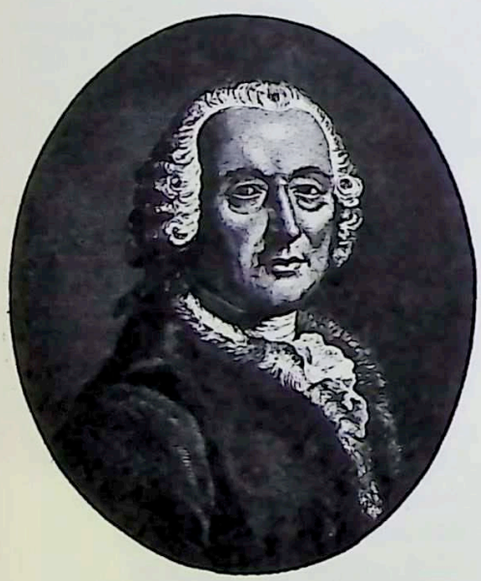
Pythagoras *(above), 6th century B.C. Greek Mathematician. (Pythagorean theorem.)* Heraclides *(left), 4th century B.C. Greek Philosopher. (Theory of earth and planets.)*

Epicurus *(below, left), 3rd century B.C.* Democritus *right), 4th century B.C. Greek Mathematicians. (Atomistic theory.)*

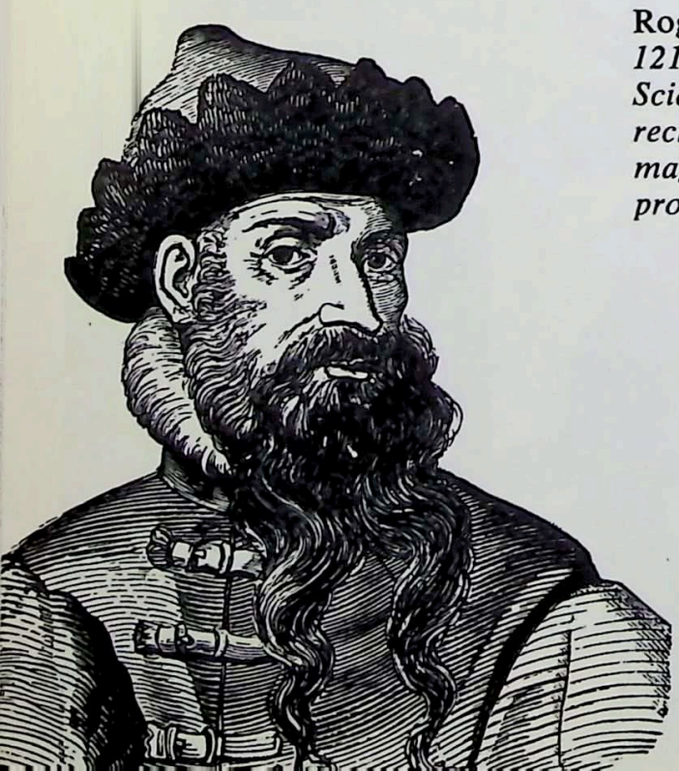


Galileo Galilei *(right), 1564-1642. Italian Physicist. (Isochronism of the pendulum; hydrostatic balance; laws of motion; thermometer; telescope; astronomical discoveries.)*





Andreas Vesalius *(above, left), 1514-1564. Belgian Anatomist. (Dissection of human body; surgical instruments.)* William Harvey *(below, left), 1578-1657. English Physician. (Theory of circulation of blood.)* Paracelsus *(right), 1493-1541. Swiss Alchemist. (Theories of treating diseases; ether.)*



Roger Bacon *(right), 1214-1294. English Scientist. (Gunpowder; rectified calendar; magnifying glasses; properties of light.)*

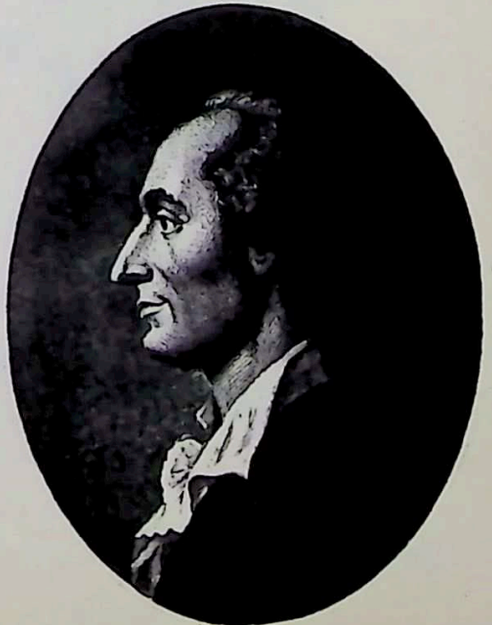
Johann Gutenberg *(left), 1400-1468. German Inventor. (Printing from movable type.)*

As a
well-spent
day brings
happy sleep,
so a life
well spent
brings happy
death.
—DA VINCI

Leonardo da Vinci *(above), 1452-1519. Italian Scientist. (Science of hydraulics; meteorology; helicopter; parachute; power loom; wheel lock pistol; flying machine; revolving stage; pendulum driven pump; bridges; ball bearings; roller bearings; clock; anonometer; worm gear and pinion.)*

Rene Descartes *(left), 1596-1650. French Scientist. (Mathematical machine; geometrical optics; science of numbers.)* Johannes Kepler *(below, right), 1571-1630. German Astronomer. (Laws of planetary motion; laws of optics and refraction; calculus.)*

William Gilbert *(left), 1540-1603. English Physicist. (Electric force; electric meter; electrical discoveries; magnetism.)* Nicolaus Copernicus *(right), 1473-1543. Polish Astronomer. (Theory of the solar system.)*



Isaac Newton *(below), 1642-1727. English Mathematician. (Theory of motion; theory of light; theory of universal gravitation; differential calculus; integral calculus; law of planetary motion; binomial theorem; velocity of sound; practical thermometer; mirror telescope.)*

If I have ever made any valuable discoveries, it has been owing more to patient thought than to any other talent.
—NEWTON

Denis Papin *(right), 1647-1712. French Physicist. (Steam engine; pressure cooker; paddle wheel boat; condensing pump; safety valve.)* Robert Hooke *(left), 1635-1703. English Astronomer. (Nature of combustion; astronomical discoveries; watch balance spring; theory of gases; Gregorian telescope; marine barometer; law of inverse squares.)*

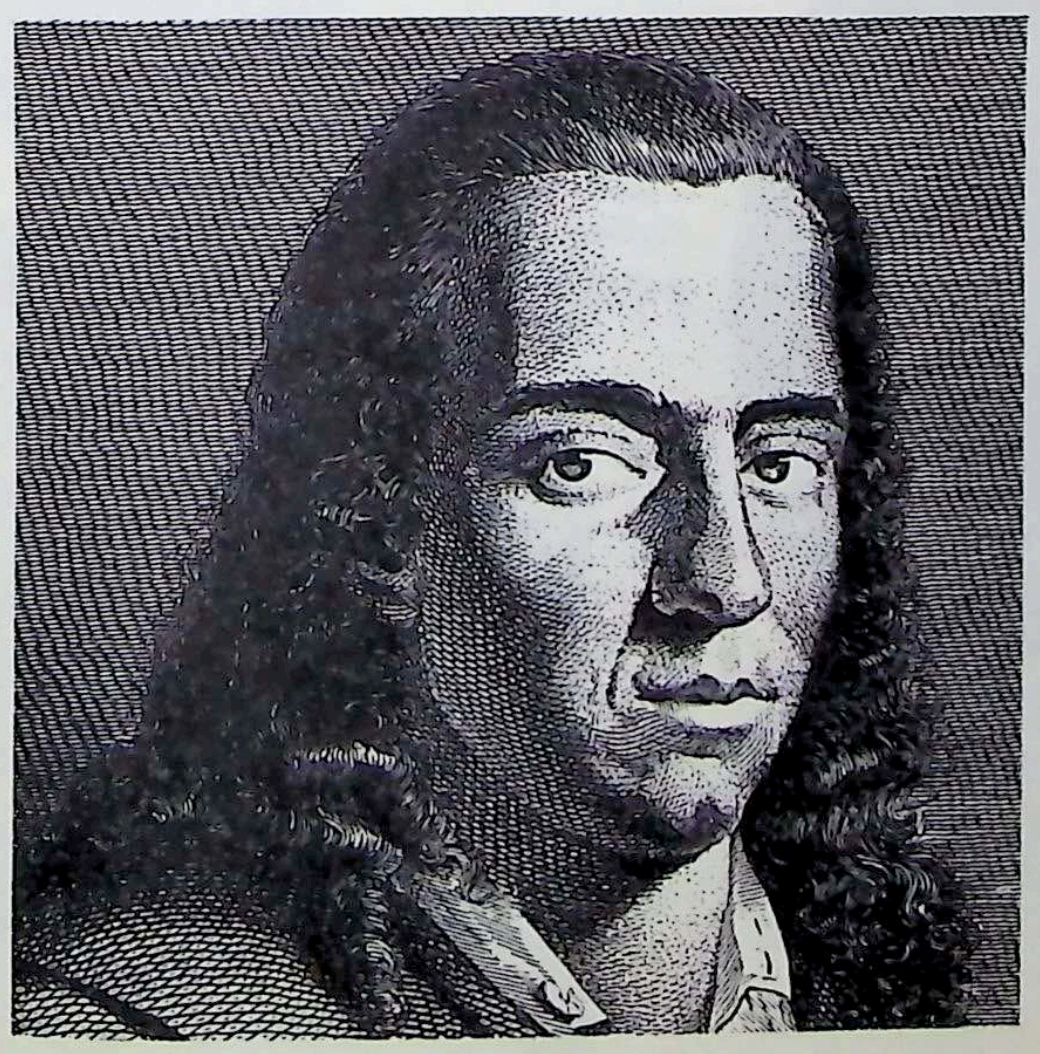
Otto von Guericke *(right), 1602-1686. German Physicist. (Electrical generating machine; air pump.)*

Edmund Halley *(left), 1656-1742. English Astronomer. (Astronomical observations; Halley's Comet; science of life statistics.)*

Blaise Pascal *(above), 1623-1662. French Scientist. (Differential calculus; theory of probability; hydrodynamics; adding machine.)*

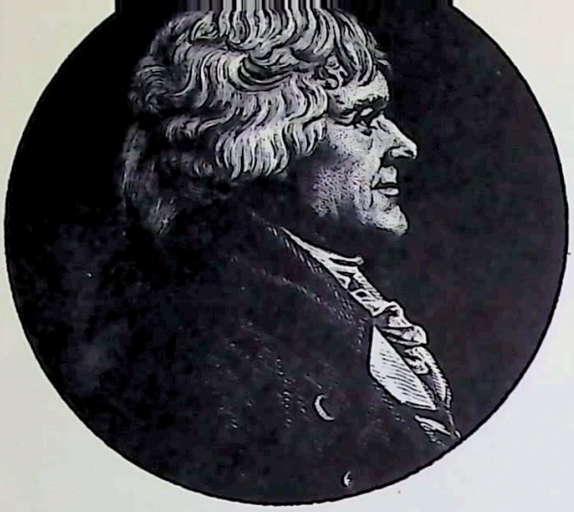
Robert Boyle *(right), 1627-1691. English Physicist. (Boyle's law; compressed air pump; pneumatic engine; propagation of sound.)*

Anton van Leeuwenhoek *(left), 1632-1723. Dutch Scientist. (Microscope; microbiology; observed microorganisms.)*

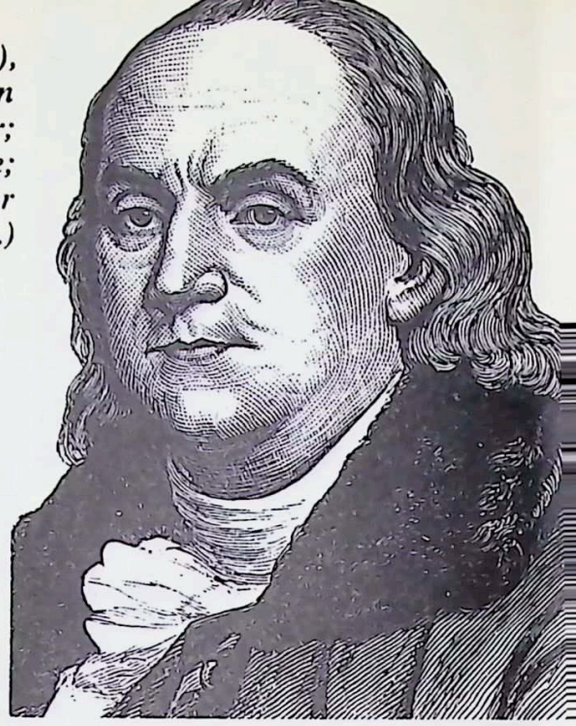


Pieter van Musschenbroek *(above), 1692-1761. Dutch Physicist. (Principle of Leyden jar; electrical condenser.)*

Christian Huygens *(left), 1629-1695. Dutch Physicist. (Huygens' principle; gunpowder machine; micrometer; theory of light; aerial telescope; astronomical discoveries; chronometer; pendulum clock.)*



Thomas Jefferson *(left), 1743-1826. American Inventor. (Swivel chair; processing hemp machine; curved plow; weather vane; dumb-waiter.)*

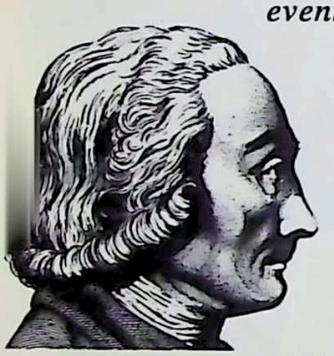


Alessandro Volta *(right), 1745-1827. Italian Physicist. (Electrical battery; dynamical electricity.)*

Benjamin Franklin *(above), 1706-1790. American Inventor. (Electrical discoveries; lightning rod; heating stove; bifocal spectacles; mileage meter.)*

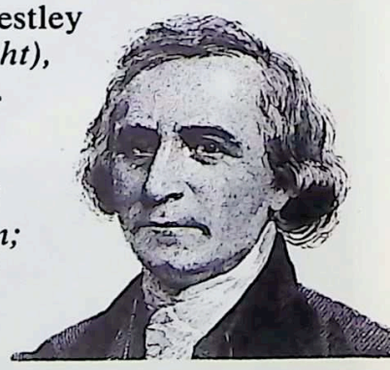
Luigi Galvani *(right), 1737-1798. Italian Physicist. (Theory of Galvanism.)*

David Rittenhouse *(below), 1732-1796. American Scientist. (Astronomical discoveries; collimating telescope; celestial events orrery.)*



Jons Berzelius *(right), 1779-1848. Swedish Chemist. (Atomic and molecular weights; discovered and isolated elements.)*

Joseph Priestley *(below, right), 1733-1804. English Chemist. (Theory of combustion; method of collecting gases.)*



Benjamin Thompson *(above, right), 1753-1814. American Physicist. (Photometer; calorimeter; Thermos bottle; nonsmoking fireplace; steam heated radiator.)*

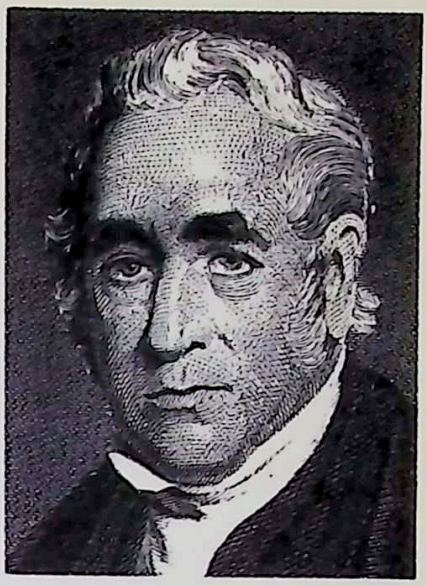
Antoine Lavoisier *(below, right), 1743-1794. French Chemist. (Process of respiration; discovery of oxygen.)*

James Watt *(left), 1736-1819. Scottish Inventor. (Steam Engine.)*

Robert Fulton *(right), 1765-1815. American Inventor. (Steamboat; steam warship; torpedo boat; submarine.)*

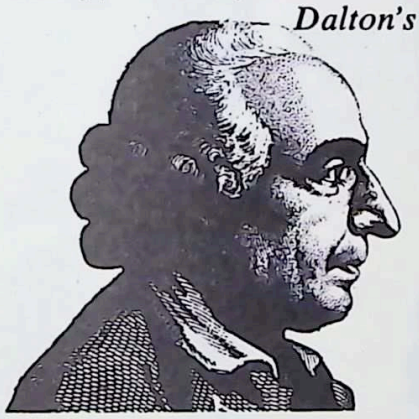
The noblest question in the world is, "What good may I do in it"?
—FRANKLIN

George Stephenson *(right), 1781-1848. English Inventor. (Railroad locomotive.)*



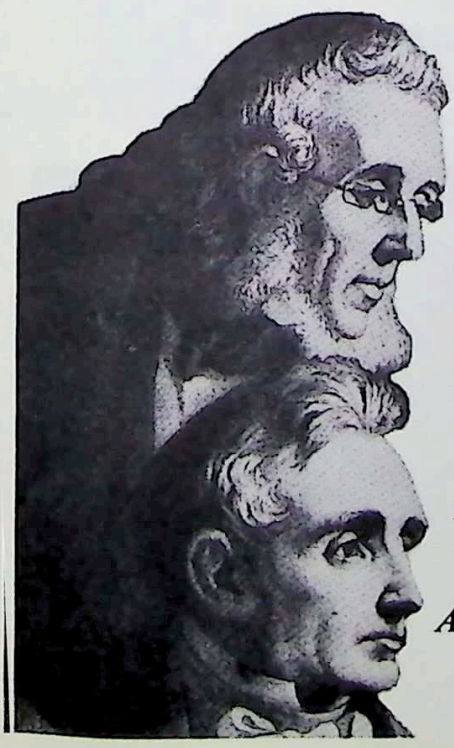
Richard Trevithick *(below, left), 1771-1833. English Inventor. (Steam road carriage; high-pressure steam engine; railroad locomotive.)*
Robert Hoe *(below), 1784-1833. American Inventor. (Steam powered printing press.)*

Joseph Henry *(right), 1797-1878. American Scientist. (Electromagnetic motor; electromagnetic telegraph.)*
John Dalton *(below), 1766-1844. English Physicist. (Atomic theory; table of atomic weights; Dalton's law.)*



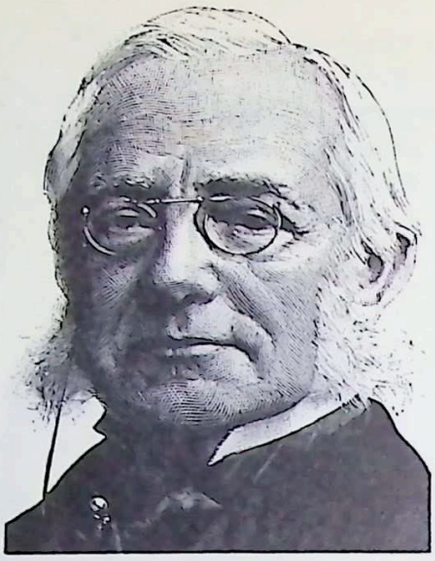
Hans C. Oersted *(right), 1777-1851. Danish Physicist. (Electromagnetism.)*

Andre Ampere *(below), 1775-1836. French Scientist. (Principles of magnetism and electricity; law of electrodynamics.)*

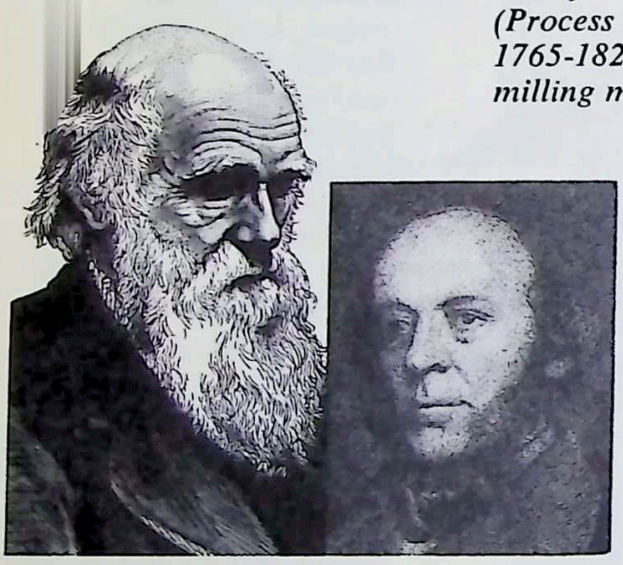


Peter Cooper *(above, left), 1791-1883. American Inventor. (Railroad locomotive.)* Charles Goodyear *(left), 1800-1860. American Inventor. (Vulcanized rubber.)*

A man
who dares
to waste one
hour of life
has not
discovered
the value
of life.
—DARWIN



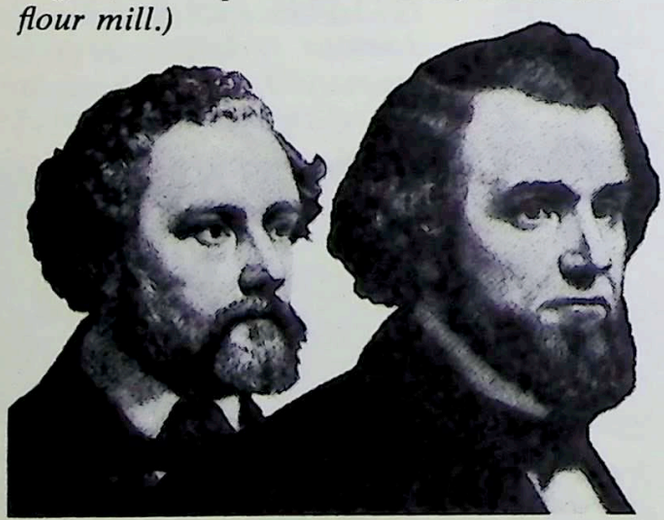
Henry Bessemer *(above, left), 1813-1898. English Inventor. (Process of steelmaking.)* Eli Whitney *(above, right), 1765-1825. American Inventor. (Cotton gin; machine tools; milling machine; musket.)*



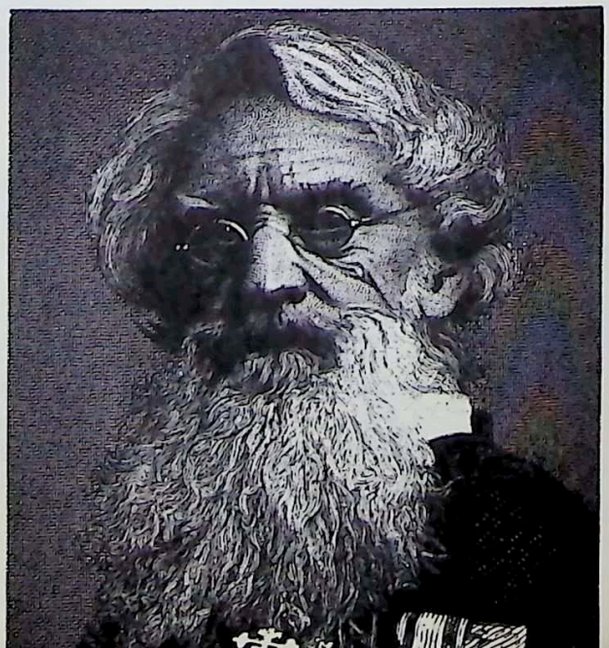
Charles Darwin *(above, left), 1809-1882. English Scientist. (Theory of origin of the human race.)* John Ericsson *(above, right), 1803-1889. American Inventor. (Locomotive; inaugurated naval engineering; steam fire engine; heavy guns and mountings; hydrostatic gage.)* Oliver Evans *(right), 1755-1819. American Inventor. (High-pressure steam engine; steam powered vehicle; automated flour mill.)*

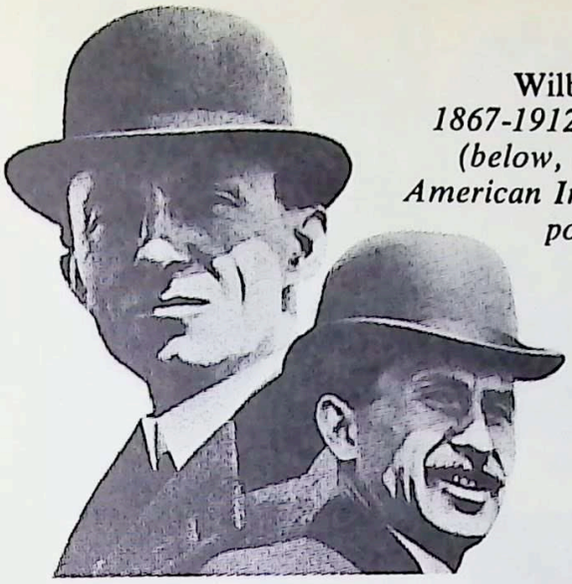
Elias Howe *(right), 1819-1867.* Isaac M. Singer *(below, right), 1811-1875. American Inventors. (Sewing machines.)*

Samuel F. B. Morse *(below), 1791-1872. American Inventor. (Magnetic telegraph; Morse code.)*

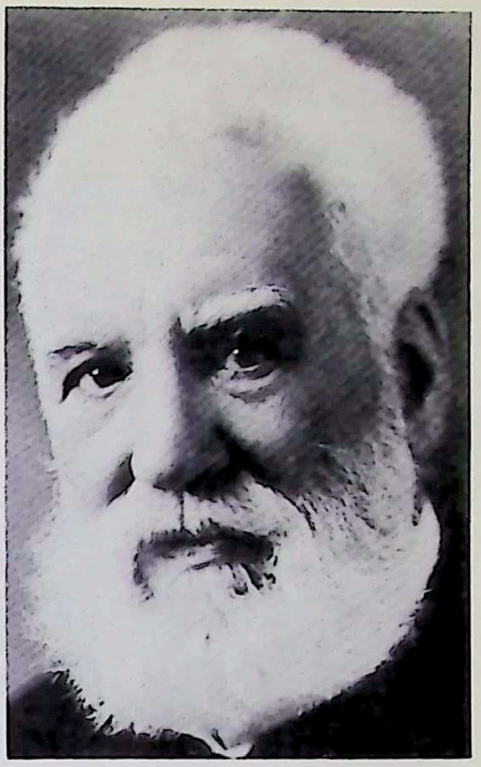


Samuel Colt *(above, left), 1814-1862. American Inventor. (Revolver.)* Cyrus H. McCormick *(above, right), 1809-1884. American Inventor. (Reaping machine.)*



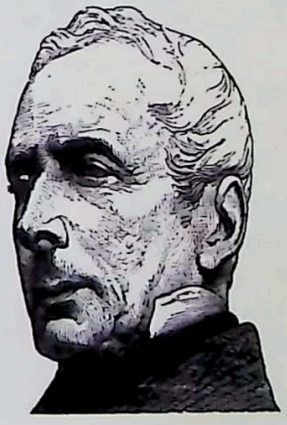


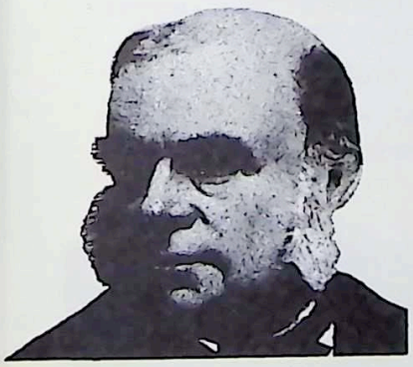
Wilbur Wright *(left), 1867-1912.* Orville Wright *(below, left), 1871-1948. American Inventors. (Motor powered airplane.)*



Michael Pupin *(above), 1858-1935. American Physicist. (Multiplex telegraphy; X-ray radiations.)* John W. Draper *(below), 1811-1882. American Scientist. (Photochemistry; photography.)*

Wilhelm Roentgen *(above, left), 1845-1923. German Physicist. (Discovered X-rays.)* Alexander Graham Bell *(right), 1847-1922. American Inventor. (Telephone; photophone; phonograph recorder.)*

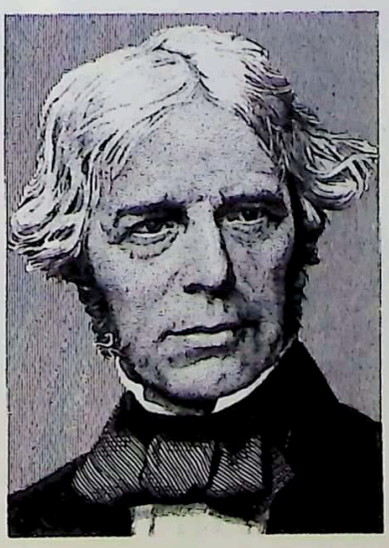


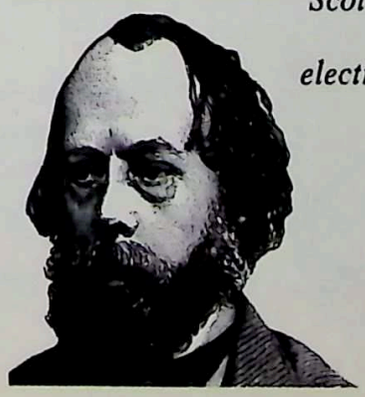


Nikola Tesla *(above), 1857-1943. American Inventor. (Induction motor; generators; transformers; condensers.)* Michael Faraday *(below), 1791-1867. English Physicist. (Electric motors; voltaelectric induction; magnetoelectric induction.)*

Rudolf Diesel *(above, left), 1858-1913. German Inventor. (Diesel engine.)* George B. Selden *(center, left), 1846-1922. American Inventor. (Gasoline driven car.)* James C. Maxwell *(below, left), 1831-1879. Scottish Physicist. (Theory of electromagnetism.)*

Herman von Helmholtz *(below), 1821-1894. German Physicist. (Theory of electricity; ophthalmoscope.)*

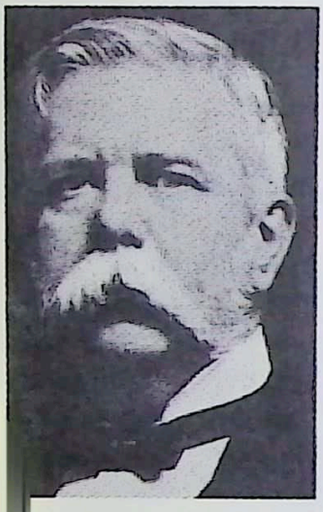




My gospel is Work—bringing out the secrets of nature and applying them for the happiness of man.
—EDISON

Thomas A. Edison *(below, left), 1847-1931. American Inventor. (Electric light; phonograph; electrical generating system; moving picture projector; storage battery; automatic telegraph; electric automobile.)* Charles P. Steinmetz *(below, right), 1865-1923. American Physicist. (Theory of alternating current; law of hysteresis; lightning arresters; generators and motors.)*

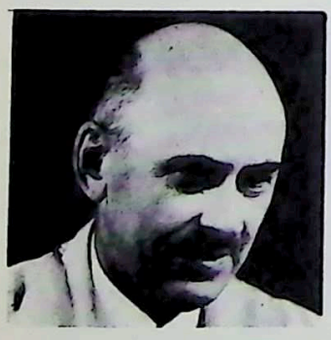
Guglielmo Marconi *(above), 1874-1937. Italian Inventor. (Wireless telegraph; magnetic detector; horizontal directional aerial; continuous wave generator.)*

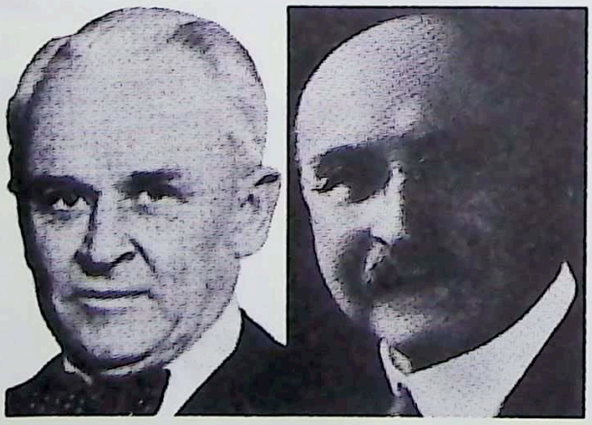


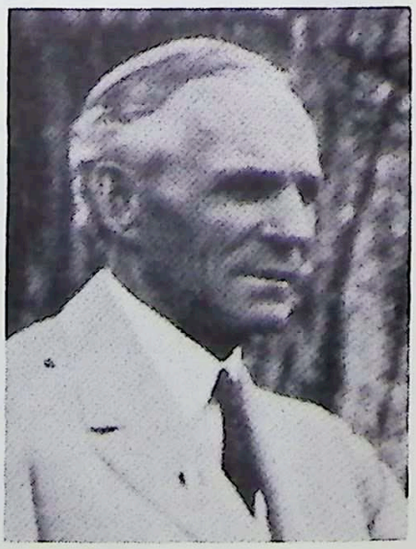
eorge Westinghouse *(above), 1846-1914. American Inventor. (Locomotive air brake; railroad signal devices; steam turbine.)* Robert H. Goddard *(below), 1882-1945. American Physicist. (Liquid-fueled rocket; gyrorocket.)*

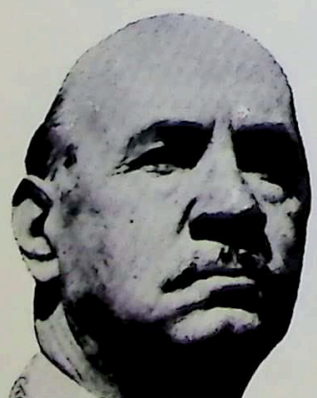
George Eastman *(above), 1854-1932. American Inventor. (Photographic plates and film; Kodak camera.)*

Robert A. Millikan *(below, left), 1868-1953. American Physicist. (Isolated electron; cosmic ray penetration; extension of ultraviolet spectrum.)* Leo H. Baekeland *(below, right), 1863-1944. American Chemist. (Photographic paper; Bakelite; plastics.)*



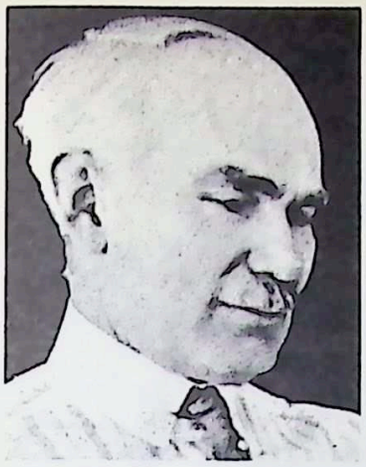






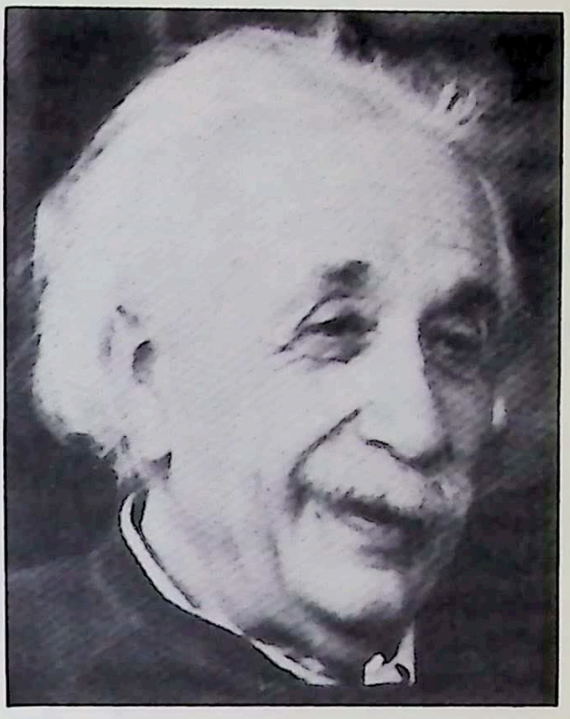
Igor I. Sikorsky *(left), 1889— American Inventor. (Helicopter.)* Frank Whittle *(right), 1907— English Inventor. (Turbojet engine.)*

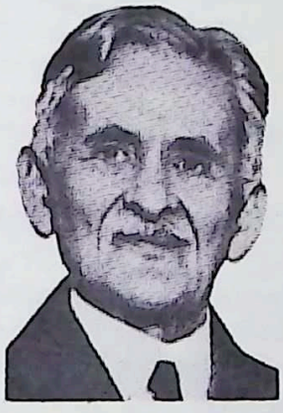
Henry Ford *(above), 1863-1947. American Inventor. (Model T automobile.)*



Lee DeForest *(above, left), 1873-1961. American Inventor. (Wireless telegraph; radiotelephony; radio detector; Audion; radio and telephone amplifier; phonofilm; cathode ray scanner for radar; feedback circuit.)* Vladimir K. Zworykin *(above, right), 1889— American Inventor. (Television Iconoscope.)*

Albert Einstein *(below), 1879-1955. American Physicist. (Theory of relativity.)*





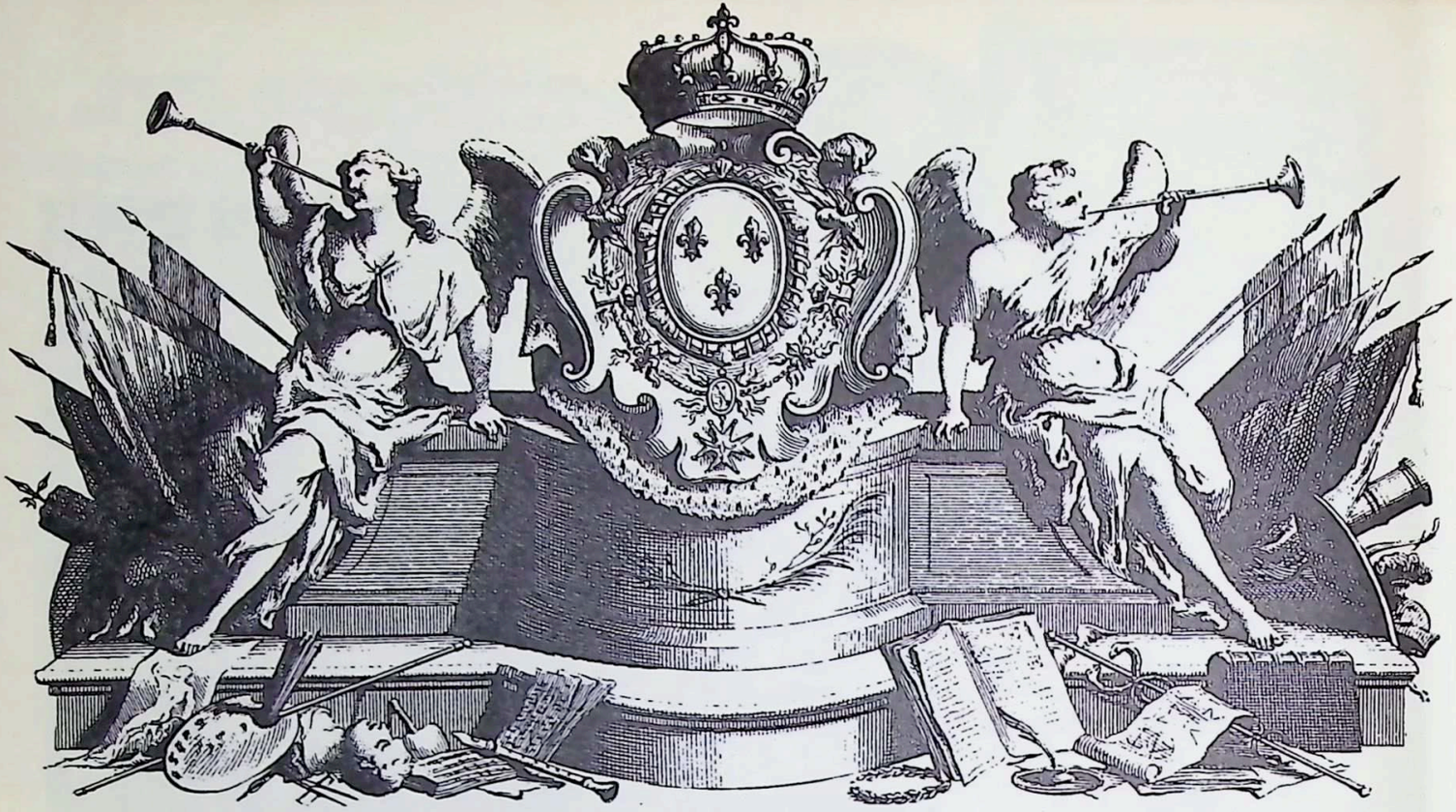
Heinrich R. Hertz *(above, left), 1857-1894. German Physicist. (Hertzian radio waves.)* Albert A. Michelson *(above, right), 1852-1931. American Physicist. (Speed of light; motion of the earth; interferometer.)*

Enrico Fermi *(left), 1901-1954. Italian Physicist. (Atomic structure; transmutations o neutrons; synthesized transuranium.)*

Joseph J. Thomson *(right), 1856-1940. English Physicist. (Electron.)*

Robert Oppenheimer *(above, left), 1904-1967. American Physicist. (Atomic energy; hydrogen bomb.)* Irving Langmuir *(above, right), 1881-1957. American Chemist. (Electron tube multigrid; tungsten filament; atomic theory.)*

Man is here on earth for the sake of other men. To work for the common good is the greatest creed.
—EINSTEIN



# The Wisdom Society

The Wisdom Society is a non-profit educational publishing organization, chartered by the State of California, and is entirely devoted to the "Advancement of Knowledge, Learning and Research in Education." It was established exclusively for educational purposes and devotes its income wholly and solely to furthering its educational objectives. The Wisdom Society is not a profit-making business or commercial enterprise. Its purpose is public benefit—not moneymaking. Like colleges and universities, The Wisdom Society operates completely in the field of education and it has won its way to world-wide renown through sheer merit of accomplishment. It has a distinguished record of public service to the nation.

The Society believes that wisdom is the basic right of every human being—like life, liberty and the pursuit of happiness. Throughout 14 years of publishing its unique magazine, Wisdom, The Wisdom Society has attained a brilliant record of achievement and service to the nation in the field of education. Wisdom Magazine, which is devoted to the highest aspirations of the human mind and spirit, has won nation-wide praise and acclaim. And The Wisdom Society has earned distinguished recognition because it exemplifies American life at its finest. With true dedication to the pursuit of wisdom—and without purpose of profit—the primary objectives of The Wisdom Society are: 1) To contribute to the advancement of the intellectual life of our nation by stimulating and encouraging the sincere pursuit of learning and education; 2) To cultivate in the largest possible number of our future citizens a deeper understanding and appreciation of the benefits which come to them from education and wisdom; 3) To communicate wisdom as well as to inspire the love of acquiring wisdom; 4) To ennoble and enrich the resources and capacities of the human mind and heart.

The Wisdom Society maintains a permanent editorial staff to research, write, illustrate, edit, and publish Wisdom Magazine, The Wisdom Books, and The Wisdom Encyclopedia, and to conduct educational research studies in all fields of knowledge. As a vital educational force, The Wisdom Society was founded to make knowledge reasonably available, more easily and more economically accessible to all; to preserve and strengthen the great ideas and ideals of the human mind in order that we might continue to enjoy the benefits

which they have contributed to our American way of life and to the enrichment of civilization; to encourage people to read widely, think deeply, and feel intensely about the world and men.

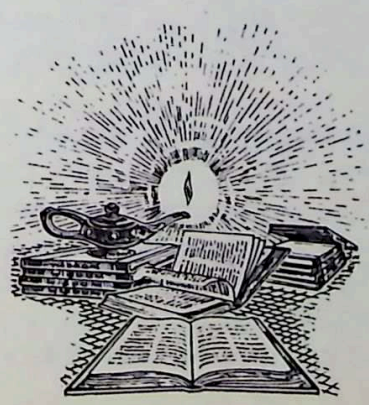
The Wisdom Society is completely independent and occupies a position of unusual freedom. It is not related to or connected with any other publishing company, commercial business, educational institution, philanthropic foundation, or religious group. An educational institution of high integrity, it is non-sectarian and non-political, and is free from the controls of needing to slant editorial policies to the judgment and the prejudices of businessmen, advertisers, and pressure groups. The Society furthers the practice of American democracy by recognizing no barriers of race, color, or creed.

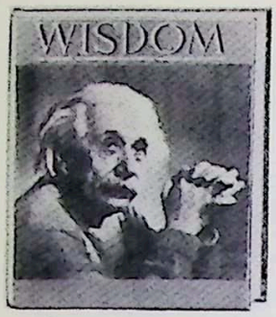
For over 14 years, Wisdom's staff of dedicated men and women have devoted all their time and energy to this great educational publishing "Venture of Faith." With courage, intelligence and perseverance, and often under the difficult and frustrating circumstances of financial limitations, progress was steadily achieved in the face of the most adverse conditions imaginable. But without the wholehearted assistance and heartwarming encouragement of many idealistic, education-minded American men and women, Wisdom Magazine, The Wisdom Books and The Wisdom Encyclopedia would not have been possible. Their respect for learning and appreciation of education, their moral and spiritual support, and their willingness to share in the noble purpose of The Wisdom Society are rich blessings and a great source of strength to the Editors.

Now, to perpetuate what was begun 14 years ago, and to achieve that which must be done in the future, The Wisdom Society extends this invitation to you to become a member of The Society. If you are a person of intelligence, education and high ideals, if you understand and appreciate the meaning of wisdom, we consider you worthy of this invitation—worthy of the privilege of helping The Wisdom Society to achieve its cherished goal and the realization of a noble dream. The Society is motivated by a sincere desire to serve humanity, and to provide the strong foundations of wisdom upon which future generations will build. The Society is young and dynamic. It stands as a shining light in the world of the intellect and the spirit. And it is filled with brilliant promise for the future.

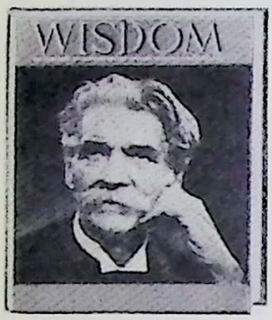
Enthusiastic acceptances to this invitation have already been received from every part of the United States—from outstanding persons who have achieved great distinction and intellectual stature in various fields of endeavor. Distinguished Americans of national and international prominence have responded enthusiastically, and have wholeheartedly expressed their deep sense of appreciation and their heartwarming faith in The Wisdom Society. These staunch believers in education have proudly and happily identified themselves as members, because The Wisdom Society is a triumph for Education as huge as any victory against Ignorance won on any battlefield.

We are sincerely hopeful that you, too, will enthusiastically respond to this cordial invitation to be a member of The Wisdom Society. And that you will proudly take your honored place among America's greatest, most highly respected and admired men and women of our time in the greatest educational venture of our time—a glorious venture that lights the Lamp of Wisdom in every mind and heart, and brings its joys and blessings into the lives of men, women and children everywhere.






ALBERT EINSTEIN

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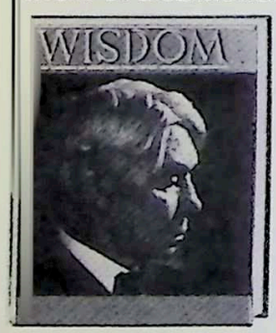
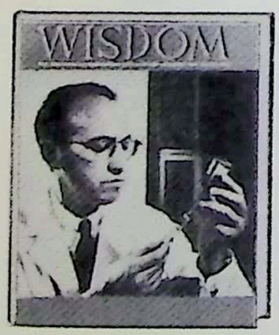



CARL SANDBURG

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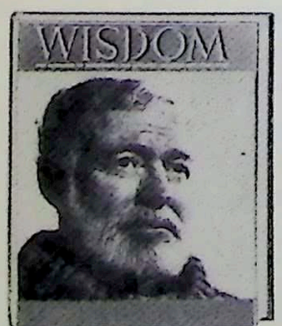



ERNEST HEMINGWAY

# *Wisdom Magazine*

The Editors of Wisdom Magazine have always been guided by a single determination—to make Wisdom the world's finest magazine of knowledge and education, and America's greatest and most rewarding reading value—a value unattained in any other publication regardless of price.

Wisdom is published not for profit but to advance the intelligence of the human mind. It provides for you a lifetime of education in a single compact magazine. It leads you to knowledge of our contemporary civilization. It is an indispensable aid in modern education. It brings together for you in one civilized magazine the sum total of human wisdom, told clearly, stirringly, eloquently, and so expressed as to meet the needs of both the present and future generations. It is a repository of all learning, a treasury of all great ideas. Wisdom has achieved a high measure of success, and has won world respect and acclaim for its masterful way of combining superb articles and supreme photographs.

Since its first edition published in January 1956, Wisdom has stood the test of time and met the most critical of all tests—usefulness and dependability in the home, school, and library. It is the world's first and only publication of its kind, an incomparable magazine with a great idea—a new kind of magazine never known before. No expense has been spared to make it a versatile, truly comprehensive, all-purpose educational magazine of timeless beauty and enduring quality. The finest paper, engravings, typesetting, printing, and binding are used. It is known the world over as America's finest magazine created, edited, and published in the proudest American tradition of excellence.

Wisdom does not duplicate any other magazine. As the dictionary operates in the field of words, and the encyclopedia in the field of facts, Wisdom operates in the field of ideas. Its contents are of lasting value and importance. It offers you a whole new world of education. No popular magazine published for the general public has ever before attempted to tell the story of man's wisdom. Wisdom enables everyone, whatever the extent of his education, age, or means, to enjoy the fruits of human imagination, inspiration, and achievement.

"The half of knowledge is to know where to find knowledge." In Wisdom you meet the great minds of all time—past and present—in every field of human thought. Wisdom Magazine is not limited in the nature of its subject matter. Its scope is world-wide. It reaches to all parts of the world for outstanding authoritative articles and pictures to bring you a clearer, quicker, fuller understanding of yesterday's age-old wisdom and of today's knowledge and achievements—extracting the wisdom of the world that can be applied to everyday living. It enables you to acquire a liberal education. It stimulates your mental growth. The up-to-date articles are adaptable to the needs and interests of men and women everywhere and shed light on their problems; yet they deal with timeless rather than purely temporary aspects of the modern scene.

Wisdom Magazine takes the world's knowledge and education for its province. The articles and pictures in Wisdom represent many thousands of man hours of endless research work through the world's public and private libraries, scientific museums, art galleries, historical archives, colleges, universities, educational institutions, photographic studios, government bureaus, and private collections on every conceivable subject—research work done

on a world-wide scope by Wisdom editors, writers, researchers, photographers, artists, illustrators, and contributing authorities and outstanding specialists in all fields of knowledge and education.

Wisdom is written in clear, simple, understandable language that requires no specialized knowledge of any subject. It is superbly illustrated by the world's best photographers and artists. Every feature is carefully selected for universal interest and importance, edited for universal appeal, and presented in readable, interesting style.

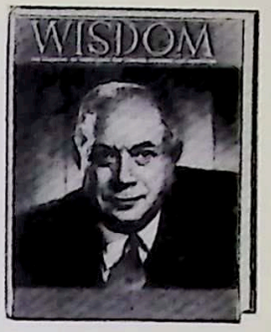
Wisdom covers all fields of knowledge: Art, Biography, Books, Business, Education, Government, History, Humanities, Law, Literature, Medicine, Movies, Music, Philosophy, Psychology, Religion, Science, Sociology, Television, Theatre, Travel, World Affairs.

Wisdom is not mass-produced like ordinary magazines, but is a limited edition magazine of classic elegance and enduring beauty. The physical make-up or format of Wisdom is a masterpiece of printing craftsmanship. It is characterized by simplicity, dignity, beauty. The page size is large—10⅛ x 13¼ inches—the paper of high quality, the type large and easy to read, the photographs and illustrations etched by master engravers. If you appreciate superb high quality, you will recognize why Wisdom must be a limited edition magazine and cannot be mass-produced. Non-sectarian and non-political, Wisdom contains no advertising, and its variety of richly illustrated articles have permanent value and lasting interest. Wisdom actually increases in value with age. It can be read, re-read, and treasured for years to come.

Please remember, you cannot buy Wisdom Magazine at any bookstore or newsstand. It is available only by membership in The Wisdom Society. By offering Wisdom Magazine direct to the readers, many distribution costs have been saved. These savings are passed on to you. Best of all, it costs so little to have Wisdom. Membership in The Wisdom Society is only $15, and includes the 5 volume set of Wisdom editions which are currently in print. (This is a generous saving of $10 under the non-member's price—at $5 a copy—for the same 5 volumes if purchased singly.)

You are cordially invited to become a member of The Wisdom Society, and discover the beautiful rewards of wisdom for yourself—now. We have every reason to believe that you will find Wisdom's superiorities worthy of your time, interest, and respect, and that you will find it an unforgettable experience infinite in pleasure and knowledge. Wisdom has won the respect, admiration, and enthusiastic support of the world's greatest men and women. This unanimous acclaim from those most demanding of perfection stands as a noteworthy tribute to the Wisdom standard of excellence. Many intelligent men and women all over America are now enjoying the valuable benefits of Wisdom, along with many outstanding Americans of distinction and prominence. You are invited to join them.

One of the most satisfying things in life is to share wisdom with those you love, and Wisdom Magazine is a wonderful way to do it. If you have a friend, relative, or business associate to whom you would like to give a gift of membership in The Wisdom Society, merely send us the name and address, and drop it in the mail, along with your check, made payable to The Wisdom Society, for $15 for each person. Be sure to include your own name and address. We will then mail to each of your friends a beautiful gift card, inscribed with your name, announcing your gift of Wisdom, along with the 5 volume set of Wisdom Magazine.



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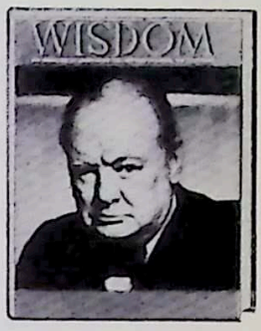

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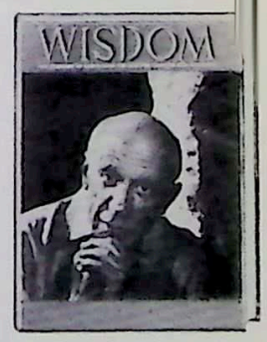

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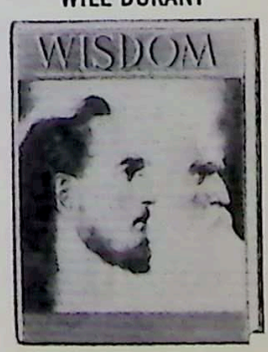
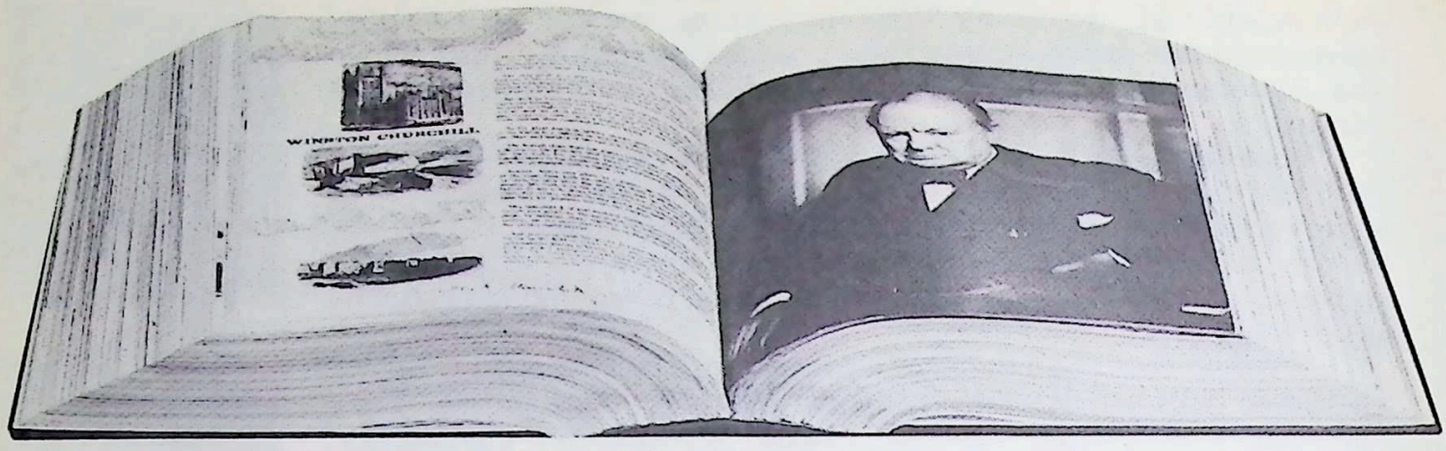


WISDOM OF THE BIBLE




# The Wisdom Encyclopedia

The Wisdom Encyclopedia is the first encyclopedia in the history of America entirely devoted to the wisdom of the world's greatest minds—from the dawn of civilization to the present time. It is a monumental educational venture of extraordinary scope and significance never before attempted. The Wisdom Encyclopedia is the result of 12 years of intensive research and editorial development by Wisdom Magazine's dedicated researchers, editors, writers, artists and photographers, working together under the editorial direction of Leon Gutterman, Founder, Editor and Publisher of Wisdom Magazine and the Wisdom Books. With vigor and imagination, Wisdom's editorial staff collaborated for 12 years with world-renowned scholars, educators, and distinguished leaders in every field of learning and education to create and produce an Encyclopedia that most scholars had never even dared to dream about before.

Just exactly what is The Wisdom Encyclopedia? Why has it been in preparation for over 12 years? For what purpose was more than $1,500,000 invested in its research and development? 1) The Wisdom Encyclopedia was created for the nation's ever-growing hunger for education; 2) To bring together for the first time, in one Encyclopedia, the great thoughts of the world's greatest minds—because life is too short to read the great thoughts of mankind as they appear in millions of books; 3) To preserve and perpetuate within its pages the inspired words of the wise—past and present—for the intellectual enrichment of all people everywhere; 4) To inspire people to understand great thoughts and the best thinking of all ages; 5) To meet the needs of countless millions of intelligent young men and women, who cannot afford to get a college education, by inspiring them with new hopes and the possibilities of infinite development; 6) To offer them the means of self-education and intellectual growth by which they may learn to live worthily; 7) To open up the treasures of wisdom to everyone in clear, easy-to-read language; 8) To kindle in young people a zeal for those qualities which education at its best represents and reflects; 9) To put the priceless benefits of wisdom within the reach of the greatest number of people regardless of age, means, or education.

It is a national tragedy that only half the adults in the United States have gone beyond grade school. Judged by reading habits and general information, our population is really not better than semi-literate. One young person in five fails to reach high school. Over half of those who enter drop out before graduating. And, from the middle and lower income groups, more than 90 per cent of the boys and girls drop out of high school. Over 40 per cent do not finish, though intelligent enough to continue, because they are prevented by lack of money. Many young people who are of college caliber and are

quite capable of doing the work would go to college if they could. But they do not go because they are too poor. Others who are equally able do not go to college because they lack the desire. Millions of American boys and girls aspire to higher education, but their parents, who sacrifice to keep their children in high school, cannot afford to send them to college. (Less than 8 per cent of our adult population are college graduates.) Therefore, countless millions of young people in our country today, bright but impoverished boys and girls, cannot fulfill their educational aspirations.

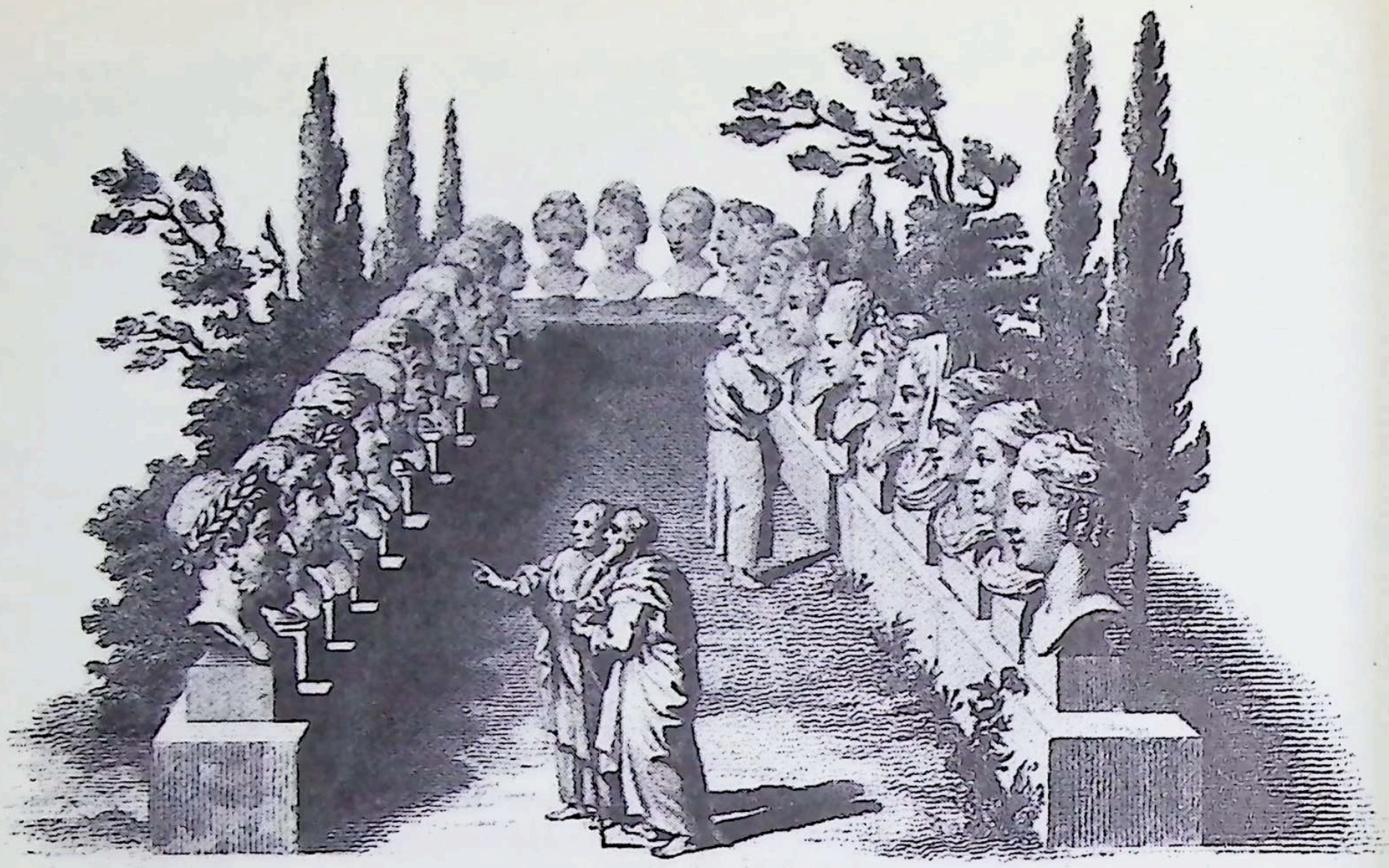
Consequently, the supreme need for The Wisdom Encyclopedia is self-evident. It fills a very great and essential function in our lives, and is indispensable to the well-being of our children. It reflects an uncompromising commitment to the highest standards of American education. A scholarly accomplishment of incredible magnitude, The Wisdom Encyclopedia is vastly different from all other encyclopedias. It is not in any way similar to the Encyclopaedia Britannica or the Encyclopedia Americana. It is not like the Great Books of the Western World, or the Book of Knowledge. It is unlike any encyclopedia ever published. The Wisdom Encyclopedia operates in the realm of great thoughts and human ideas as the dictionary does in the realm of words and language. And as a general encyclopedia does in the realm of fact and information. Through The Wisdom Encyclopedia, the civilized individual is a citizen of the entire universe. He is a spectator of all time and all existence.

An unprecedented cultural achievement, The Wisdom Encyclopedia is a modern compilation and a unique treasury of the world's greatest thoughts condensed in quotation form. Because education changes like society changes, The Wisdom Encyclopedia is based upon the newest knowledge and is designed from today's perspective entirely. It covers the entire range of human thought throughout all the ages on all subjects, all lands, all cultures, all languages.

The Wisdom Encyclopedia contains the superb pictorial illustrations of thousands of the world's most talented artists, painters, sculptors, illustrators and photographers. The many thousands of beautiful illustrations and photographs have been carefully selected to inform the mind as well as to delight the eye with immense visual pleasure. Thus, compressed into one Encyclopedia, and for the first time in history, here is the invigorating wisdom of 4000 years, from pre-historic times to the present day, vividly brought to life with fresh power and given contemporary vitality. Supplemented by brief biographies, here are the greatest thoughts of thousands of the most brilliant minds of all the ages: Authors, Philosophers, Historians, Educators, Poets, Emperors, Statesmen, Economists, Scientists, Jurists, Sociologists, Biographers, Novelists, Essayists, Orators, Clergymen, Psychologists, Physicians, Psychiatrists, Composers and Painters. There has never been anything in the world like The Wisdom Encyclopedia.

Infinitely fascinating and enormously readable, The Wisdom Encyclopedia is of inestimable value as an authoritative and comprehensive reference work for all students, teachers, parents, business and professional people. Written and edited expressly for reading enjoyment, it is for everyone no matter what his or her age, educational background, vocation, or field of work. An incomparable Encyclopedia equivalent in scope to many thousands of costly books, it is essential in every home where education is valued and respected. Every family, especially those with children, will cherish it forever as a precious possession, for it can be shared by all.

Truly inspiring, The Wisdom Encyclopedia will be read and treasured in homes, libraries, schools, colleges and universities. Timeless in spirit and modern in language, it will be handed down from generation to generation as a living source of learning and education. For The Wisdom Encyclopedia is the only Encyclopedia ever created that can never grow old, never become outdated. Time will enhance rather than diminish its value, for wisdom is ageless and timeless, and will endure forever.



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